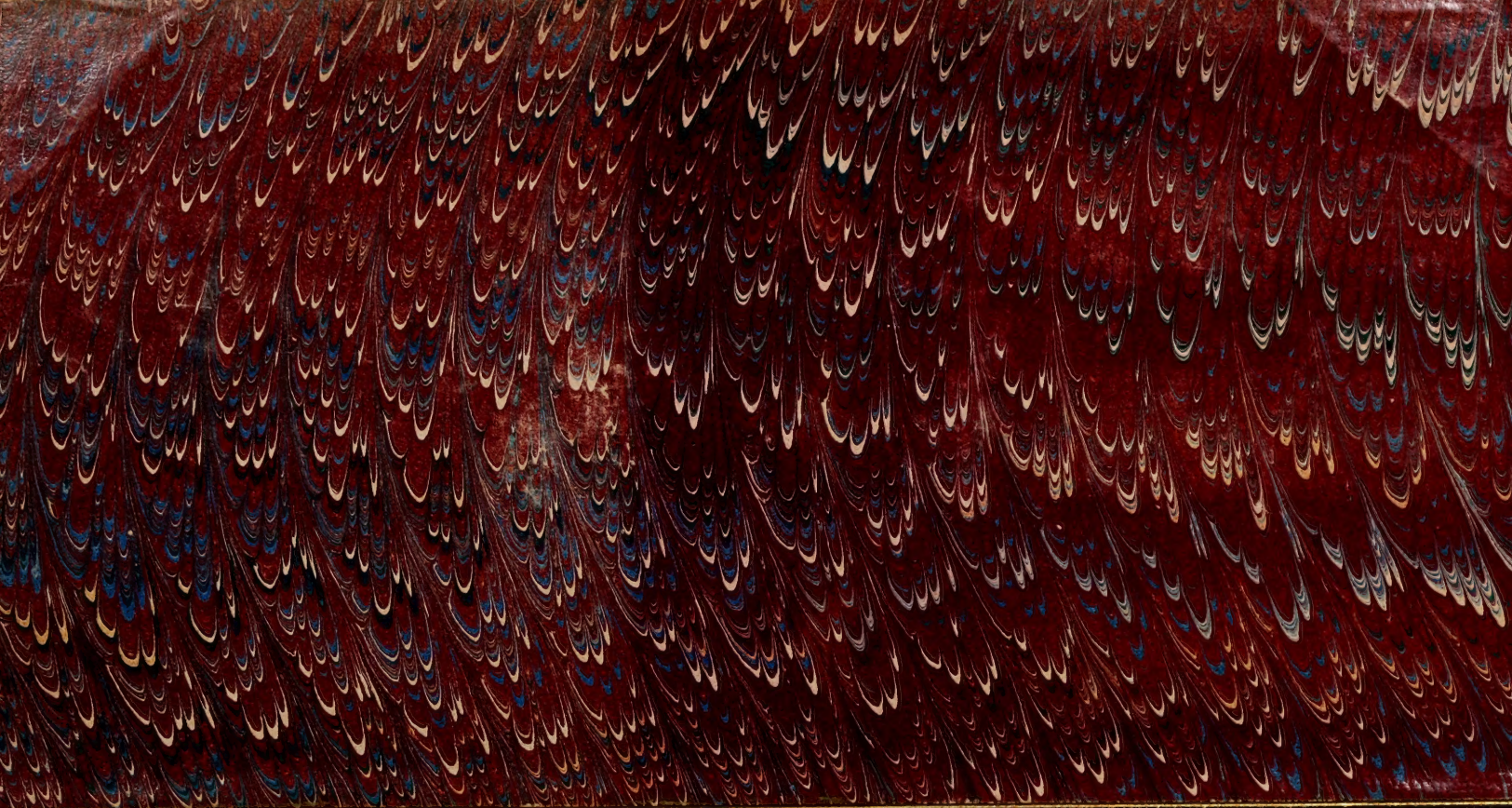

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THE CANADIAN

ENTOMOLOGIST.

VOLUME XIX.

EDITED BY THE

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AN EXPLANATION.

BY WM. SAUNDERS, LONDON, ONT.

A protracted absence from home has prevented me from offering earlier to the readers of THE CANADIAN ENTOMOLOGIST an explanation of the circumstances which have led to my resignation of the post I have held so long as Editor of this journal. For thirteen years it has been my pleasure and privilege to be thus brought in contact with most of the active workers in the Entomological field, with many of whom I have held pleasant intercourse both by correspondence and in person, and it occasioned me much regret when I found it necessary to sever my connection with those editorial duties which had hitherto given me so much pleasure. Shortly after the proposal was made that the Government should establish a number of experimental farms in Canada, I was employed to collect such information as might aid in determining the best course to pursue. This enquiry resulted in my becoming greatly interested in the work, and subsequently in my accepting the position of Director of the same. The duties of this office are so weighty and constant as to make it necessary for me to give up all other engagements and devote to it my entire time and thought. Since Economic Entomology is one of the subjects which will claim attention at the principal or central farm, I hope still to be able, if not directly, at least indirectly, to aid in advancing this important branch of Entomological study. I desire to tender my sincere thanks to the many kind friends who have aided me in the past by supplying useful matter for the journal, and would bespeak for my esteemed and able successor a continuance of that confidence and support. Our readers may rest assured that my withdrawal from the editorial chair will not in any way lessen the value and usefulness of THE CANADIAN ENTOMOLOGIST; indeed, I have reason to believe that, under the skilful management of the newly appointed Editor, the Rev. C. J. S. Bethune, the future of our valued monthly will in many respects be an improvement on the past.

NOTE ON THE EUROPEAN GRAPTA C ALBUM.

BY W. H. EDWARDS, COALBURGH, W. VA.

In the Entom. Mo. Mag., xxiii., p. 186, Jan., 1887, is the statement by Mrs. Hutchinson, of Leominster, to this effect: that the writer caught a female *C Album* which was hovering about currant bushes, and obtained from her many eggs, laid between 27th April and 6th May. The eggs hatched between May 5th and 11th, and the larvæ were full grown from 17th to 23rd June. The first butterfly came from pupa 26th June, the last 3rd July. "*Two of the insects paired on June 30th, and the female commenced laying on 1st July*, and continued doing so until the 10th, when there were 120 ova in all." (Neither one of this pair then could have more than four days out). From these eggs butterflies were obtained, from 17th to 27th August. "Several pairs were put together, but no ova were obtained." I do not know whether this last means that actual copulation took place or not, but should suppose not, as eggs could not have been formed in the ovaries, these butterflies being of the last brood of the year, and the one which hibernates.

The interesting point in this narrative is that butterflies will pair in captivity. I myself have never known such an instance, but in CAN. ENT., xviii., p. 17, it is recorded that a pair of Satyrus *Alope* paired when put under a net, as observed by Miss E. L. Morton. Some butterflies come from pupa with eggs mature. I have seen pairs of *P. Ajax* copulating, when the wings of the female were not yet dry. In case of Heliconia *Charitonia*, the pairing often takes place before the female is clear of the pupa skin. Argynnis *Myrina* has been recorded as pairing almost immediately after both sexes left the pupæ. And the eggs of *P. Tharos* are fully formed on coming from chrysalis. On the other hand, many species require 10 or 15 days at the least to mature their eggs, as our larger Argynnids, several Papilios and others. It is well worth while to experiment with different species in this direction.

These observations of Mrs. Hutchinson settle the question as to *C Album* being single or double-brooded. Westwood, in Humphrey's Brit. But., 1846, says the species is double-brooded. But Newman, Brit. But., 1871, p. 50, says that an idea seems prevalent that there are two broods in the year, but that he thinks it is a mistake, and never had satisfactory evidence of it. So that up to 1871, it seems not to have been a settled

question. No book that I have gives any farther information. The "Larvæ of British Butterflies," by the late Wm. Buckler, recently published, says nothing on the point.

There are three American species of Grapta, at least, which correspond to, and represent, *C Album*, namely, *Comma*, *Satyrus* and *Faunus*, and so high authorities as Dr. Staudinger and Mr. Möschler once pronounced all these to be *C Album*. But after figures of the larva of *Comma* were published, 1871, But. N. A., vol. 1, and descriptions of the larva of *Satyrus* by Messrs. H. Edwards and Pearson, it was everywhere conceded that these two were not *C Album*. That was something gained. But many, especially European, authors still hold *Faunus* to be *C Album*. *Faunus* is remarkable for its lack of variability. Examples from all localities are identical in coloration and markings. Whereas *C Album*, if all the phases in color, markings and size, which in Europe pass as *C Album*, be really but one species, a matter which I very much doubt, varies wonderfully, and takes in not only phases like the three American species mentioned, but of three or four others, and some not represented in America. And now comes proof that *C Album* is two-brooded, while it is certain that in no part of its territory is *Faunus* more than single-brooded, although in a considerable part of such territory it flies in company with *Comma*, and apparently the season is as favorable in these districts for two broods in *Faunus* as in *Comma*. *Faunus* is a sub-boreal species, flying from one ocean to the other, but to the southward it also occupies Canada and parts of New England, New York, Pennsylvania, and Virginia, and even to Georgia, in the mountainous sections. And being boreal and one-brooded, it is fair to presume that it came from the north; that at the time, ages ago, when the two continents were united, the species occupied the northern parts of both. When the separation took place, the European branch split into numerous varieties, and became double-brooded, yet retained its identity as one species (that is, if the European lepidopterists of to-day are right in their views), and shows nowhere differences between any of its preparatory stages—one multiform species.

And the other branch, on the western continent, threw off diverse forms, several of which have come to have very different caterpillars from the original type. These also came to be two to four-brooded, and two, at least, became seasonally dimorphic in coloration. But one form, *Faunus*, remains single-brooded, and shows no tendency to vary, and may

be presumed to be nearer to the primeval type of the species than any of the forms that now compose the group. Of course, this one-brooded, non-varying form is to-day not the same thing as the two-brooded, very variable form found in Europe. They have come to be two distinct species. It is unfortunate that even now so little is known of the early stages of *Faunus*. It is a matter that the northern lepidopterists should have studied, and all stages from the egg might easily have been seen and described. There may be important differences between the larvæ and pupæ of *Faunus* and *C Album*.

ADDITIONS TO THE LIST OF CANADIAN LEPIDOPTERA.

BY J. ALSTON MOFFAT, HAMILTON, ONT.

I give the following names in the Geometridæ as new to the Canadian List:—

1. Caberodes majoraria, Guen.
2. Endropia marginata, Minot.
3. " textrinaria, Grote.
4. Ephyra pendulinaria, Guen.
5. Arthena lucata, Guen.
6. " albogilvaria, Morr.
7. Deilinia variolaria, Guen.
8. Semiothisa minorata, Pack.
9. Phasiane mellistrigata, Grote.
10. Thamnonoma brunneata, Thun.
11. Cymatophora umbrosaria, Hub.
12. Heterophleps Harneiata, Pack.
13. Lobophora anguilineata, Grote.
14. " montanata, Pack.
15. Petrophora prunata, Linn.
16. " lunigerata, Walk.

All the common species that were easily obtained in this locality, have had names in my collection for many years, but owing to the changes that were being made in the genera and synonymy of species, I was not in a

position to follow them up, so that when Mr. Grote's "New Check List" appeared, which I have followed in this, I found that several of my old names had disappeared altogether, and others had been rendered doubtful.

The Rev. Geo. D. Hulst, of Brooklyn, N. Y., opened communication with me last fall, with a view to exchange; he also at the same time kindly offered to name anything he could for me. Gladly availing myself of the services of so competent an authority, I sent to him all that I considered doubtful in my collection, as well as the new and unnamed material I had on hand. The result was the correction of several errors, as well as the addition of new species to my list. Nos. 1 and 2 are old specimens. No. 5, one specimen taken last summer. No. 6, quite common here. No. 8, one specimen, last summer's capture. No. 11—my Cymatophoras were badly mixed, and I have some single specimens that yet want determining. No. 12, quite a common insect here, but which I had the pleasure of adding to Mr. Hulst's collection, where it was wanting. No. 15, a single specimen; 16 a single specimen I have had for years, and have not met with another, and have only seen one in any other collection. Mr. Hulst gives it as *Cidaria lunigerata*, var. *dispunctaria* Pack. Of the other numbers, I have received the names from different sources in recent years.

Mr. Hulst also named some that are new to me, but already in the Canadian List. Last summer is generally acknowledged to have been poor in Lepidoptera, yet I was quite fortunate in obtaining new things in the Geometridæ, although so many of them were but single specimens of a kind.

A NEW HOMOHADENA.

BY G. H. FRENCH, CARBONDALE, ILL.

Homohadena Elda, n. sp.

Expanse 1.30 inches. Apex very slightly produced, the posterior angle rounded; eyes naked; palpi oblique, projecting beyond the head in their natural position about the width of the eyes; tibiæ unarmed; abdomen equalling the hind wings; covering of thorax mostly scales. Color, warm gray, slightly wine tinted; basal half line black, not very distinct, strongly angulated outward on the subcostal vein, a black basal dash crossing the lower end of this line, the space enclosed between the costa

and these two lines sordid white; t. a. line black, double, the inner portion sub-obsolete, general course nearly straight, but from the costa to median vein extending slightly inward, and from median to sub-median slightly arcuate outward, as also from sub-median to posterior margin; median shade prominent, smoky black, straight, extending from costa to posterior margin, in width .04 of an inch, a gray spot in the lower end of it, and bordered externally by the internal portion of the black annulus of the reniform, and below median venules by what seems to be a portion of the t. p. line; t. p. line obsolete save some black points between white on the veins and the arcuate black portion before spoken of, bending outward round the reniform and inward below this; sub-terminal line whitish, irregular, faintly sending gray streaks to the margin on the veins. Stigmata large; orbicular elongate transversely to the wing, black annulate with a white shading inside this; reniform kidney-shaped with the outer depression quite prominent, a prominent black border toward base of wing, but none or only slight on the outside, inside this a white bordering that extends round the spot. Outer margin a black line, fringe concolorous with the wing. Hind wings pale smoky gray, nearly uniform, slight indication of a line through the middle, fringe whitish. Thorax gray with the shoulder tufts and posterior scales black tipped. As this covering had been slightly disturbed, could not tell whether these posterior scales formed a low tuft or not, but should think they did. Under side gray, with but faint indication of marks.

Described from two females from Soda Springs, Sishyon Co., California, one in the cabinet of James Behrens, and the other in the cabinet of G. H. French, captured in September, 1885.

NORTH AMERICAN TACHINIDÆ.

GONIA.

BY PROF. S. W. WILLISTON, NEW HAVEN, CT.

The genus *Gonia* is one easily recognized by reason of its peculiar structure of the head and antennæ; unfortunately the separation of species is a much less simple matter. As is so frequently the case, isolated speci-

mens frequently furnish grounds for much more decided opinions than a richer material will sustain. I describe in the present paper five species that present characters sufficiently decisive to render their recognition not doubtful; other species I forbear to name till my material is richer. It will be seen that I make little use of the structure of the arista, a character that has been relied upon much in the European species; but I am satisfied that it is a variable one in individuals of the same species, and is, moreover, distinctly sexual. There is a distinct variation in different species in the position of the anterior cross-vein, as regards the termination of the auxiliary; of how much value the character is I am not yet decided.

Generic characters.—Moderately large species, not very bristly. Head very large, inflated; front very broad, only a little narrower in the male, with numerous, not very strong bristles; face in profile nearly perpendicular, the epistoma but slightly projecting; the oral margin with a row of bristles, not ascending on the edges of the median facial depression. Cheeks broad; bare, or with short bristles. Antennæ elongate; third joint two or three times as long as the second in the female, from four to eight times in the male; arista stout, composed of three joints, the second and third elongate, and joining each other at an angle, as though broken. Eyes bare. Palpi cylindrical. Scutellum with six strong bristles on its border. Abdomen broad oval or ovate; first and second segments each with a pair of median posterior bristles and one extreme lateral posterior one; third segment with a row on the posterior border. No spinule at tip of auxiliary vein; fourth vein obtusely angulated, without stump of vein, terminating in the costa a considerable distance before the tip; posterior cross-vein much nearer the angle than to the anterior cross-vein.

Head yellow, except the occiput, palpi yellow; thorax black, margins of dorsum and scutellum often yellowish; legs black. Larvæ, so far as known, parasitic on hymenoptera and lepidoptera.

Table of Species.

1.—Abdomen wholly black, or at most only somewhat reddish on the sides of base; claws and pulvilli of male small. . FRONTOSA Say.
Abdomen largely or wholly red or yellow. 2
2.—Face and antennæ golden yellow; claws of male small. . SENILIS, n. sp.
Face and antennæ not golden yellow. 3
3.—Sides of face, pleuræ and femora with yellow hair; claws and pulvilli of male small. . . . . PORCA, n sp.

Sides of face with black bristles; pleuræ not with yellow hair.....4
4.—Abdomen reddish yellow, with or without small black spots; claws and pulvilli of male small.....SEQUAX, n. sp.
Abdomen largely black; claws and pulvilli of male large..EXUL, n. sp.

GONIA FRONTOSA Say, J. Acad. Phil. vi., 175; Compl. Wr. ii., 365.
Gonia philadelphica Macquart, Dipt. Exot. ii., 3, 51, 6.
? Gonia albifrons Walker, List, etc., iv., 798.

♀. Length 9.5-10 m.m. Face and front light yellow, with a silvery, or slightly golden sheen; front a little translucent on the sides when seen from above; face on the sides with short black bristles, and a number of longer ones near the sides of the median depression; median depression in its greatest width about as wide as the least width of the sides of the face; cheeks with short black bristly hairs only. Antennæ blackish brown, the second joint and base of third yellowish; second joint about one-third the length of the third; second joint of the arista not more than three-fifths the length of the third. Palpi yellow. Dorsum of thorax black; the humeri, post-alar callosities, and scutellum in large part, luteous yellowish; dorsum, when seen from behind, distinctly gray pollinose, leaving four slender stripes. Bristles of scutellum long, reaching to base of third abdominal segment. Abdomen deep shining black; the second segment with a very narrow, the third with a narrow, the fourth with a moderately broad, basal white-pollinose cross band. Wings nearly hyaline behind; the costal, subcostal and first basal cells very distinctly tinged with brown.

♂. Length 9-10 m.m. Front distinctly narrower, and more projecting below. Median facial depression deeper, larger, and longer, broader below than the sides of the face. Antennæ larger and longer, the second joint shorter, not more than one-fifth or one-sixth as long as the third; arista shorter than the joint, its second joint curved, three-fifths, or three-fourths as long as the third. Dorsum of the thorax a little more hairy. Abdomen more elongate or egg-shaped, the sides of the second and third segments sometimes reddish. Tarsal joints of front feet a little less disciform, the claws a little longer.

This description is drawn from twelve females, mostly collected together in Fairmount Park, Philadelphia, by Mr. E. Keen, and eight males from Minnesota, collected together. They are all closely related, and their absolute identity seems certain. Among these specimens, however,

there is no absolute uniformity in the length of the aristal joints, though not much discrepancy.

All the rest of my specimens, from various localities throughout the United States, are larger, reaching twelve and a half millimetres in length and none of them as small as the largest of the ones described. The pollinose bands of the abdomen are usually broader on the second and third segments, the wings in none so strongly infuscated proximally, and in most the infuscation is more or less obsolete; the antennæ vary from red to black, the second joint of the arista in the female varies from one-third to three-fourths as long as the third joint; in the male from one-half as long to longer. The dorsal thoracic stripes vary from very slender ones in Colorado specimens, to broader and more distinct ones in New England, North Carolina, and Southern Californian ones. Specimens from Carolina and New England have the basal part of the venter yellowish red, with moderately large spots on the sides of the basal segments above. A specimen from Wyoming has the thoracic dorsum strongly pollinose, and the bands of the abdomen unusually broad. Two others from California have the second joint of the arista very short, not a third of the length of the third, the wings scarcely at all infuscated in front, and, unlike all the other specimens, the cheeks do not have black hairs, but yellow pile; other specimens from California, however, are like the eastern ones in this respect. Yet another, rubbed (female) specimen, from Connecticut, differs in having the sides of the face distinctly narrower, considerably narrower than the median portion. The bristly hairs on the sides of the face vary not a little in size; those of the described specimens leave a more bare space below on the inner side, that is less, or not at all, apparent in the larger specimens.

The value of these various characters I confess myself unable to decide. Only this much seems certain, no, or little reliance can be placed upon the comparative lengths of the aristal joints; and the second joint is always longer and more bent in the male than in the female.

I think there can be little doubt but that this is Say's species; his "large, obsolete, reddish brown spot near the base" of the abdomen is not usually, though frequently, present. The synonymy of *G. philadelphica* seems equally certain. The species must be closely allied to, possibly identical with *G. fasciata* Meigen, of Europe, the larvæ of which have been found in nests of *Bombus terrestris* and *Megilla retrusa*, where the flies deposit their eggs. A specimen from the Boston Society of

Natural History, somewhat teneral with red antennæ, bears the label: "From *Pyrrharctia isabella*, Apr. 24."

Altogether, I have examined about seventy-five specimens, from New England, New York, Pennsylvania, North Carolina, Indiana, Minnesota, Montana, Colorado, Wyoming, Northern and Southern California.

GONIA SENILIS, n. sp.

♂. Length 10 m.m. Front and face golden yellow, not very changeable, the vertex on either side sub-translucent when seen from above; sides of the face considerably narrower than the median depression, clothed with short black bristles. Antennæ wholly pure orange-yellow, the tip of arista brownish, second joint very short, third very long, six or eight times longer than the second; second joint of the arista shorter than the third. Thorax not densely pollinose, when seen from behind, with four slender stripes, scutellum luteous at tip only. Abdomen black, the sides broadly red, forming a moderately broad lateral posterior margin to the first and reaching to about the middle of the third segment on the sides; pollinose bands broad. Wings nearly hyaline, anterior cross-vein nearly opposite the middle of the subcostal section of the costa. Claws and pulvilli small.

One specimen, Western Kansas. Although I have but the single specimen, I venture to describe this species. The color of the antennæ seems evidently normal; should it really be darker in other specimens, however, the other characters given will, I believe, render the species recognizable.

GONIA PORCA, n. sp.

♂. Length 13 m.m. Face and front light yellow with a silvery sheen, the front, except in a very oblique light, oily translucent on the sides; sides of the face without the usual short black bristles, except above; the largest part, as also the cheeks, is clothed with long fine hairs or pile; the usual row along the sides of the median depression. Median depression wider than the sides of the face below. Antennæ black, the third joint five or six times longer than the second; second joint of the arista shorter than the third. Dorsum of thorax thinly pollinose, stripes not very distinct; the sides more or less and the scutellum luteous yellow. Pleuræ with long fine yellow hairs or pile. Abdomen yellowish red, shining; pollinose bands narrow, that on the second very

narrow; first segment, under the scutellum, the second with a median stripe, the third with a stripe more or less dilated behind, and the fourth chiefly, black. The anterior femora behind with long fine light yellow hair. Wings nearly hyaline, the costal cells scarcely infuscated.

Two specimens, Mt. Hood, Or. The moderately abundant, long, light yellow fine hair on face, pleuræ and four anterior femora is characteristic.

GONIA EXUL, n. sp.

♀. Length 12, 13 m. m. Front and face light yellow, with a semi-translucent appearance as though oiled; when seen obliquely, with a silvery sheen; sides of the face with numerous, short, black bristles, on the inner part, near the sides of the median depression, with three or four moderately stout bristles; median depression small and narrow, not as wide as the sides; cheeks without black bristles. Antennæ blackish brown, second joint and base of third yellow; second joint about one-third the length of the third; arista variable, third joint not twice the length of the second. Dorsum of thorax gray pollinose, when seen from behind leaving four moderately broad stripes, the margins more or less and the scutellum yellow. Abdomen yellowish red; first segment under the scutellum, the second with a broad median stripe, the third except the anterior angles, or, rather, with a large triangle reaching the whole width of the segment behind and touching in front more or less broadly, the dorsum of the fourth wholly black; pollen of the whole abdomen variable in different reflections, but most conspicuous on the base of the third and the whole of the fourth segments. Wings nearly hyaline, the veins yellowish, except posteriorly.

Ten specimens, Connecticut, Massachusetts, New York.

a. Males from California, that I cannot distinguish, have the antennæ wholly black, the third joint five or six times the length of the second, the face strongly silvery pollinose, and the claws and pulvilli very large, considerably longer than the terminal joint of the tarsi. In some, the black triangle on the third abdominal segment is much smaller. A female with them seems to agree in all respects with the Eastern specimens.

b. A female specimen from California, with the abdomen marked similarly, has the third joint of the antennæ shorter, not more than twice the length of the second, the second joint of the arista very short, and the bristles on the sides of the median depression not parallel with the edge, but divergent, whisker-like.

c. Two female specimens from Arizona differ distinctly in having a broader and more projecting face, smaller eyes, whiter and more dense pollen on face, thorax and abdomen. Another specimen with these two, however, though agreeing in the latter respects, has the face of the usual width.

d. A male specimen from North Park is of a distinct species, though closest allied to the present. The sides of the face are unusually narrow, the front short, convex and almost horizontal, the abdomen marked more like that of *G. senilis*, the size smaller (11 m.m.), the claws and pulvilli large.

GONIA SEQUAX, n. sp.

♂. Length 12–13 m.m. Like the males of *exul*, except that the abdomen is either wholly yellowish red, with a black spot under the scutellum, and a brownish hind margin to the third segment, or with a slender black stripe on the second, and a small triangle on the third and fourth segments. The claws and pulvilli are very much smaller, much shorter than the terminal joints of the tarsi.

Three specimens, California.

NOTES ON THE GENUS EXOPROSOPA.

BY D. W. COQUILLETT, LOS ANGELES, CAL.

In my paper on "The North American Genera of Anthracina," which appeared in the last volume of the CAN. ENTOMOLOGIST (pp. 157–159), I proposed the name *Velocia* for those species of *Exoprosopa* which have four submarginal cells in each wing. Through the kindness of Dr. Williston, I have been put in possession of a paper by Prof. Camillo Rondani, entitled "Dipterorum Species et Genera Aliqua Exotica," published in 1863 in the Archivio per la Zoologia, vol. iii., and on pages 56 and 57 of this paper Prof. Rondani proposes the name *Hyperalonia* for the above group; this name being the earlier, must supersede the one proposed by me.

In the same paper Prof. Rondani proposes the name *Argyrospila* for those species of *Exoprosopa* in which the third and fourth veins are joined together before the margin of the wing, instead of reaching the margin

separately; but I am firmly convinced that this character is too variable to be used for a generic separation. In a large series of *Exoprosopa doris* O. S. collected in Los Angeles County, Cal., every grade occurs, from the widely open first posterior cell to the contracted, closed in the immediate margin, or some distance before the margin of the wing. Those of the latter kind do not otherwise differ in any respect from the ones in which this cell is wide open, and as specimens of the latter kind were taken at the same time and place as the former, there seems to be no doubt of their specific identity.

I have discovered another form, closely related to *Exoprosopa*, but differing from it and from all other Anthracina known to me, in that the first posterior cell is divided by a cross-vein into two cells; following is a description of this new form:

Exoptata, n. gen.—Third antennal joint furnished with a distinct terminal style; second vein issues from the third opposite or nearly opposite the small cross-vein; anterior branch of the third vein connected by a cross-vein with the second, forming three submarginal cells; first posterior cell divided into two cells by a cross-vein placed some distance before tip of discal cell; anterior branch of third vein and veins 2, 3 and 4 terminate in margin of wing; no pulvilli.

Exoptata divisa, n. sp.—Front obscure chestnut-brown, pale yellowish tomentose and black pilose; face reddish-brown, pale yellowish tomentose; hyperstoma much produced; first two joints of antennæ reddish-black, black pilose, third joint black, elongate-conical at base; style about one-sixth as long as third antennal joint; proboscis projecting length of labella beyond the hyperstoma; occiput black, yellowish-white tomentose. Thorax black, yellowish tomentose, the sides and collar yellowish pilose; bristles above insertion of wings, black; pleura yellowish pilose. Scutellum reddish-brown, yellowish tomentose, the margin beset with black bristles. Abdomen obscure reddish-brown, irregularly spotted with black; first segment and base of the second pale yellow tomentose, apices of second and third segments black tomentose, base of the third white tomentose, fourth segment mixed black and yellow tomentose, fifth, sixth and seventh segments white and sparsely black tomentose; sides of first segment and base of second yellowish pilose, sides of rest of abdomen black pilose; venter obscure reddish-brown, third and fourth segments black tomentose except a white tomentose spot in centre of each; other segments white tomentose. Legs and tarsi wholly black, the tomentum,

pile and spines also black; front femora and tibiæ destitute of stout bristles, claws of front tarsi scarcely visible. Wings blackish brown, the following parts hyaline; apices of marginal and first submarginal cells; second and third submarginal cell wholly; apical half of outer first posterior cell; second, third and fourth posterior cells except spot in base of each, that in second posterior cell extending into the third; apices of third basal and axillary cells; and middle third and apex of discal cell. Veins at bases of first submarginal, inner and outer first posterior, and of the third and fourth posterior cells, bordered with sub-hyaline. Halteres brown, the knob yellowish. Length 12–15 m. m. Two specimens. Cal.; Ariz. (Williston).

ALETIA ARGILLACEA.

BY A. R. GROTE, BREMEN, GERMANY.

I have found in various collections in Europe, both public and private, specimens of the moth of our Cotton Worm determined after Hübner as above. From a note from Dr. Staudinger, I gather that in his collection the moth is so determined and as proposed by me. Were I now to propose to call this species by its synonym, *Noctua xylina* Say, I do not think any of the entomologists in Europe would agree thereto, or be governed by Dr. Hagen's reasons for the change. Say was no Lepidopterist, and his posthumous description of the moth is not recognizable, only that he tells us it is the moth so injurious to cotton. By this we translate his description. But Hübner's figure and text are quite sufficient to identify the species, and he gives us the proper classification of these moths. I myself have shown how *Aletia* and *Anomis* are to be separated. The latter, with its orange colored and angulated wings, is a sort of tropical *Xanthia*. The tropical genera of *Noctuidæ* are all less woolly than the temperate forms. In *Aletia*, the smooth, untufted body, the entire wings, the broad head, prepare us for the Catocaline moths, *Poaphila* and *Agnomonia*. It differs from *Anomis erosa* by the broader wings, with straight external margin, and, as I first pointed out to Prof. Riley, by the number of false feet in the larva. There is a second true species of *Aletia* in Texas, *hostia* of Harvey, but this second cotton-feeder is also Southern and may have been described from Mexico or Central America previously.

The generic group is tropical. *Aletia* extends into the temperate regions, attracted by its food plant and urged by an inner impulse to migrate northwardly during our summer, helped on its wanderings by the winds from the Gulf. But the winter overtakes and extirpates it over a wide territory, fortunately for the planter.

BOOK NOTICES.

THE BUTTERFLIES OF INDIA.

We believe we are doing the readers of the CANADIAN ENTOMOLOGIST a service in calling attention to a work on the Butterflies of India,* which has been in progress for five years, and of which two volumes are now finished. It was begun by Major Marshall and Mr. de Nicéville, of the Calcutta Museum, but at the conclusion of the first volume Major Marshall was obliged to withdraw from active participation in the work and leave its completion to his coadjutor, who has just given us the second volume.

The task will be appreciated when its extent is known. "India, the land of sunshine, is a land of Butterflies," says the opening passage of the preface, and yet the empire includes within its limits "every climate, from the eternal snows to the tropics." The number of known forms is vast. Following the order of Kirby's Catalogue, the work has reached the Lycænidæ, and scarcely half is done; yet in these two volumes over six hundred species are already described from a region less than half as large as that embraced in Edwards' Catalogue of our species. The generic and family descriptions are almost wholly copied from Doubleday and Westwood's "Genera," but the species are freshly described, and there are added keys to the genera of each family and to the species of every genus or minor group of species. Geographical distribution, habits and variation

* The Butterflies of India, Burmah and Ceylon. A descriptive handbook of all the known species of Rhopalocerous Lepidoptera inhabiting that region, with notices of allied species occurring in the neighboring countries along the border; with numerous illustrations. By Major G. F. L. Marshall and Lionel de Nicéville, Calcutta. Vol. 1; 8 + 327 p., 18 pl., 1882–84. Vol. 2; 8 + 332 p., 8 pl., 1886. 8°.

are the principal topics treated in the non-descriptive matter, and this is reasonably full for such a work, and adds very decidedly to our knowledge. Undoubtedly when the insects come to be reared, many of the nominal species will be found to belong together, for De Nicéville has already discovered the probable existence of seasonal dimorphism in the Bombay Butterflies, "there being in several species an ocellated form which occurs only in the rains, the cold and dry seasoned being non-ocellated."

We regret, however, to say that the work adds practically nothing to our knowledge of the earlier stages. This will surely follow the publication of this first and only handbook to the Butterflies of England's great eastern empire, for, as the authors point out, such a work as the present is a *sine quâ non* to an attempt at that co-operation through which alone any great advance can be made toward a general knowledge, either of the elements of the fauna or of the life-histories of its prevailing types. When we remember, however, that our knowledge of the transformations of eastern Butterflies has hardly advanced in fifty years as much as it advanced at a bound a half century ago by the labors of Horsfield alone, we are glad to be assured that when this present preliminary task is done, Mr. de Nicéville will direct his energies and the grand opportunities his position at the Indian Museum afford him to this more telling work. We wish him then all speed in the completion of the present task.

One word about the illustrations, which are wonderfully good. They are drawn by two native artists, Grish Chunder Chuckerbutty and Behari Lall Dass—they must be natives—and mostly reproduced by "autotype" in London; they are therefore monochromatic, but the results are far superior to anything we have seen in which photography has borne a part. The half tones are wonderfully caught, and their closest examination reveals the unusually skillful and delicate touch of the artist. There are twenty-six plates in the two volumes, including one good chromo-lithograph, a plate of structural details, and one of caterpillars and chrysalids, besides a dozen or more wood cuts in the text.

The book will be completed in four or five octavo volumes of fine type, and it is expected within three years. Each of the volumes completed costs 14 rupees (about 25 shillings), and it is hoped that 60 rupees will cover the entire cost. Subscriptions can be sent to B. Quaritch, 15 Picadilly, London, Eng.

S. H. Scudder.

CATALOGUE OF CANADIAN PLANTS. PART III: APETALÆ, by John Macoun, M. A., F. L. S., F. R. S. C., Montreal. 1886.

The last publication issued by the Geological and Natural History Survey forms the third part of Prof. Macoun's Catalogue of Canadian Plants. Part I., POLYPETALÆ, and Part II., GAMOPETALÆ, have already been noticed in these pages. Part III., APETALÆ, carries the work on to the end of the Exogens and completes Volume I.

The value of this important work, which is quite indispensable to every student of Canadian Botany, is much enhanced by the Addendum and comprehensive Index of the whole volume, contained in the present Part. In the former we find corrections and additions to the information recorded under each species in Parts I. and II., so as to bring our knowledge of the whole of the plants mentioned down to date, and in the latter not only are the orders, genera and species given, but every synonym also appears.

In the publication of this work Prof. Macoun confers a lasting benefit upon the scientific world. No living Botanist has the knowledge of Canadian plants which he has acquired. Possessed of a keen faculty of observation which almost amounts to an instinct, he has had the advantage of travelling extensively and of collecting and studying in their native habitats most of the plants which have been found growing spontaneously in Canada. Moreover, by generously assisting all who apply to him for information, he has secured the hearty co-operation in his work of all the active Botanists in Canada, so that the "Catalogue of Canadian Plants" is not only a record of his own vast experience, which extends over a period of more than 30 years of constant study, but also includes the work of all other collectors and Botanists who have investigated or written upon the Flora of the Dominion.

So closely are the studies of Botany and Entomology associated together that some knowledge of Botany is actually a necessity to the Entomologist; particularly is this the case in the interesting work of investigating the life-histories of insects. It frequently happens that a very slight knowledge of the affinities of a given plant may save from starvation valuable larvæ which have been transmitted to a distance from the place where their proper food-plant occurs. Most larvæ will subsist upon plants of the same genus or others closely allied to them.

A good instance of this is presented in the numerous *Colias*, all of

which will flourish upon the Common White Clover *(Trifolium repens)*, although in a state of nature they may, according to the species, feed upon plants belonging to a dozen different genera, all of which, however, will be found to be of the same Natural Order as the clover *(Leguminosæ)*. The *Argynnides*, again, will all feed upon our common blue Violet *(V. cucullata)*, as will the *Pierides* upon common and easily procured cruciferous plants.

On the other hand, for a right understanding of the shapes and positions of flowers, and for a full appreciation of the beautiful methods by which fertilization of the ovules is secured, a knowledge of the structure and habits of insects is of inestimable value.

There is, too, an economic aspect of this case, for if insects will survive upon plants which are only and perhaps distantly allied to their natural food, it is obviously necessary that the cultivator should take this into consideration when engaged in the constant strife which he has to wage against injurious insects, and we even find that some species will actually flourish better upon such cultivated plants, when grown in large numbers; the Colorado Potato Beetle may be instanced in this connection, which thrives so luxuriantly upon the cultivated potato, but which, when confined to its natural food, the *Solanum rostratum*, eked out but a precarious existence. Otherwise it is useless to abstain from the cultivation of any crop which has been badly attacked, as a means of starving out its insect enemies, in a locality where there are numerous wild plants or weeds which are allied to the plant which it is desired to grow. This must be borne in mind with regard to the many pests affecting cereals which are able to find ample temporary lodgment in the various wild grasses.

J. Fletcher.

NOTE.

Living Pupæ.—The Rev. W. J Holland (5th Avenue, Oakland, Pittsburgh, Pa.) has a large number of living pupæ of *Telea Polyphemus*, *Actias Luna*, *C. Promethea* and *Angularis*, *E. Imperialis* and *C. Regalis*, reared in the South, which he desires to dispose of at reasonable rates. His object is to assist and encourage a poor lad whom he has interested in Entomology. Application should be made to him at once.

CORRESPONDENCE.

BRITISH COLUMBIAN HYMENOPTERA.

Dear Sir,—I wish to acknowledge through the pages of THE CANADIAN ENTOMOLOGIST the following type specimens of British Columbian Hymenoptera, which will form a valuable addition to the Society's collection, from the Rev. George W. Taylor, of Victoria, B. C.:

Ichneumon Vancouveriensis, Prov.,	CAN. ENT.,	xvii.,	p. 114.
Platysoma (nov. gen.) *tibialis*, Prov.,	"	"	115.
Limneria compacta, Prov.,	"	"	116.
Mesoleptus fasciatus, Prov.,	"	"	116.
Phylax pacificus, Prov.,	"	"	117.
Phylax niger, Prov.,	"	"	117.

The types of *Mesoleptus fasciatus* and *Phylax pacificus* were unluckily injured in transmission, but the others are in good order. This donation was announced at the last annual meeting, but was omitted from the report of the meeting published in THE CAN. ENTOMOLOGIST. I take this opportunity of drawing the attention of our members to the importance of following Mr. Taylor's example in presenting to the Society types of new species, or unique specimens, so that they may be placed in a position of safety, and at the same time may be accessible for examination by all. We have at present the finest collection of Canadian insects extant, and it is to the advantage of all of us to add to it and make it as perfect as possible. We have a commodious museum and good cabinets, so that all donations will be properly cared for and will be highly prized.

JAMES FLETCHER, President Ent. Soc. Ont.

NORTH AMERICAN BUTTERFLIES.

Dear Sir,—In Mr. W. H. Edwards' last catalogue of the Diurnal Lepidoptera of America north of Mexico, is given, on pages 80-81, a list of species formerly credited to the North American fauna, but which he

omits for want of authentication. Among the species so enumerated I find the following:

Callidryas cipris, Fab.
Gonepteryx mœrula, Fab.
Terias elathea, Cram.
Megistanis acheronta, Fab.
Aganisthos orion, Fab.

Now I have specimens of all of these species which I purchased a few years ago from Mr. Herman Strecker, the locality in which they were taken being given by him as Texas. Now as it is of course inconceivable that an Entomologist of Mr. Strecker's standing would attach a false locality to a specimen in order to sell it, I trust that Mr. Edwards will include these species in his next catalogue.

H. H. LYMAN, Montreal.

LEPIDOPTEROUS LARVA.

Dear Sir,—In response to the very interesting communication on page 124 of volume xviii. of THE CANADIAN ENTOMOLOGIST, I would suggest to the two lady Entomologists that the larva is very probably that of the Birch Dagger (*Apatela vulpinam.*) It is certainly, I think, that of one of the Dagger Moths, and, if there is a variation in the color of the tufts from published descriptions by Mr. Thaxter, perhaps it is not enough to suspect a different species. I need not add that it gives me great pleasure to see the interest which our ladies take in the study of Entomology, nor how very much we owe to them already, as Mr. Edwards has recently shown in the story of the discovery of the Aphid-feeding larva of that interesting butterfly, *Feniseca Tarquinius*. In my earliest papers I referred to the important discoveries of women in a science which needs delicate powers of observation and handling. From Madam Merian to our own day, the list widens gloriously, and I often wish that the names and addresses of all the lady workers in America could be got together. When I come home again I mean to try and secure them for publication, and I hope (as every one must away from home) that the day will be soon.

A. R. GROTE, Bremen, Germany.

The Canadian Entomologist.

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COLLECTING AT THE ELECTRIC LIGHT, 1886.

BY HENRY S. SAUNDERS, LONDON, ONT.

On the evening of Saturday, May 22nd, 1886, being the first warm evening after the electric light system was started in London, hundreds of "electric light bugs" *(Camptobrochis grandis)* and large green Calosomas *(Calosoma scrutator)* came into the city, and from that time on throughout the summer, and even as late as Nov. 2nd, the lights continued to attract hundreds of insects every warm evening.

There are some general points I should like to mention before giving the list in detail :—The lights around which all the collecting was done, were in store windows, or just outside of them, and these were in the centre of the city ; the insects were either on the glass, on the woodwork around it, or on the sidewalk. Moths were taken with a bottle as in sugaring ; beetles taken by hand and put into a separate bottle. Cyanide of potassium I found the best poison ; a few drops of chloroform on cotton would quiet them more quickly, but was more troublesome, the chloroform having to be frequently renewed, occasionally as often as four or five times during the same evening, and sometimes even then the moths would be found alive the next morning.

My collecting was all done between 10 and 12 p. m. No lights were lit on Sundays, and I was out of the city from July 24 to Aug. 9.

On very cold nights very few insects would come out ; on cool nights a few moths were always to be found, but seldom any beetles ; on warm nights both beetles and moths were plentiful. Beetles were *very* plentiful only on the warmest evenings.

Often on wet evenings the Sphingidæ would be plentiful when there was scarcely anything else out.

My record of dates is very incomplete, as I had no idea while collecting of publishing them in this way.

There are about 35 Lepidoptera and 5 Coleoptera that I have not suc-

ceeded in getting named; the Orthoptera, Hemiptera, etc., I scarcely collected at all; having but little time at my disposal, I thought it wiser to give attention mainly to those orders in which I was more particularly interested.

I take this opportunity of thanking Prof. C. H. Fernald, of Amherst, Mass., Mr. Jas. Fletcher, and Mr. W. H. Harrington, of Ottawa, for the kind assistance they have given me in naming specimens.

LEPIDOPTERA.

Nymphalidæ.

Vanessa antiopa, *Linn.*, June 21.*

Sphingidæ.

Deilephila chamænerii, *Harr.*, June 1–22.
" lineata, *Fabr.*, Sept. 4.
Everyx myron, *Cram.*, June 17 to July 15, constant. Very common.
Ampelophaga versicolor, *Harr.*, July 17.
Smerinthus geminatus, *Say*, June 15.
Paonias excaecatus, *A. & S.*, June 14, July 9. Common.
Calasymbolus myops, *A. & S.*, July.
Triptogon modesta, *Harr.*, June 29, July 12.
Cressonia juglandis, *A. & S.*, June 2–18.
Ceratomia amyntor, *Hubn.*
Daremma undulosa, *Walk.*, June 28, July 10. Common.
Sphinx drupiferarum, *Ab. & S.*, June 8 to 22. Common.
" kalmiae, *A. & S.*, June 8.
" eremitus, *Hubn.*, May 31.
Dilophonota ello, *Linn.*, Sept. 28–30.†

Ægeriadæ.

Trochilium——? May 28–29, June 14, July 1–16. Very common.

Eudryas unio, *Hubn.*, June 15–16, July 1, Aug. 9. Common.
" grata, *Fabr.*, June 25, July 1, 7, 19. Common.
Ctenucha virginica, *Charp.*, June 19.

Bombyces.

Nola ——? July 16.
Hypoprepia fucosa, *Hubn.*, July 20.
Euphanessa mendica, *Walk.*, June 21.
Crocota treatii, *Gr.*, July.
Arctia virgo, *Linn., var.* parthenice, July 19.
" Saundersii, *Gr.*, August 24.
Pyrrharctia isabella, *Abb. & S.*, June 5 to July 20, very common.
Phragmatobia rubricosa, *Harr.*, July 15.
Leucarctia acraea, *Drury*, June 23, August 19.
Spilosoma virginica, *Fabr.* Very common from May 26th to Aug. 20; one taken Oct. 20.
Hyphantria cunea, *Drury*, June 19, July 20.
Euchaetes egle, *Drury*, June 28.
Halisidota caryae, *Harris.* Very common from May 27 to June 25.
" maculata, *Harris*, June 7–25. Common.

* This butterfly I did not see in motion; it was in rather a sleepy condition, and may possibly have flown there during daylight.

† Eight specimens of this moth were taken in London about this time.

Orgyia leucostigma, *A. & S.*, July 14–20, Sept. 24, Oct. 22.*
Euclea querceti, *H. S.*, June 16, July 1.
Ichthyura inclusa, *Hubn.*, Aug. 11.
" albosigma *Fitch*, May 27, June 15.
Datana ministra, *Drury*, June 14, 16, 23, July 9.
" integerrima, *G. & R.*, June 23, July 9.†
Nadata gibbosa, *A. & S.*, July 3.
Gluphisia trilineata, *Pack.*
Seirodonta bilineata, *Pack.*
Notodonta stragula, *Gr.*
Cœlodasys unicornis, *A. & S.*
Heterocampa marthesia, *Cram.*
" astarte, *Doubl.*
" cinerea, *Pack.*
Cerura borealis, *Boisd.*, June 5–16.
" cinerea, *Walk.*, May 28, June 15.
Actias luna, *Linn.*, June 7.
Telea polyphemus, *Cram.*, June 2, 28, 30, July 2. Common.
Platysamia cecropia, *Linn.*
Dryocampa rubicunda, *Fabr.*, May 26 to July 1. Very common.
Clisiocampa americana, *Harris*, July 1, 5.
Gastropacha americana, *Harris*, June 16, July 22.
Tolype laricis, *Fitch*, Aug. 13, 24.
Prionoxystus robiniæ, *Peck.*

Noctuæ.

Raphia abrupta, *Gr.*, (?) June 15.
Habrosyne scripta, *Gosse*, July 23.
Apatela occidentalis, *G. & R.*, May 29, June 11. Common.
" vinnula, *Gr.*
Apatela lepusculina, *Guen.*
" morula, *G. & R.*, June 24.
" innotata, *Guen.*
" rubicoma, *Guen.*
" americana, *Harr.*, June 9, 18, July 1. Very common.
" hæsitata, *Gr.*
" brumosa, *Guen.*, June 1.
" dissecta, *G. & R.*, July 6.
" oblinita, *A. & S.*, June 8, 15. Very common.
Arsilonche albovenosa, *G.*, May 27, June 9.
Harrisimemna trisignata, *Walk.*, July.
Micrococlia diphteroides, *Guen.*, June 14, 16.
Agrotis C nigrum, *Linn.*, June 19, 21, 23, Aug. 21, 24, 26, 30. Very common.
" haruspica, *Gr.*, July 7.
" fennica, *Tausch.*, Aug. 10.
" subgothica, *Haw.*, August 24, 30.‡
" tricosa, *Lintn.*, Aug. 12, 13.
" plecta, *Linn.*, May 29, June 1, 19, 21, 23, 25, Aug. 11, 12, 18, 20, 24, 26. Common.
" clandestina, *Harris*, June 28, 29.
" scandens, *Riley*, June 15, 19. Common.
" murænula, *G. & R.*
" tessellata, *Harris*, June 26, 29. Common.
" campestris *var.* decolor, *Morr.*, July 2, 6.
" collaris, *G. & R.*
" annexa, *Tr.* (?).

* None seen between July and September; those taken in the fall were larger and darker than in the summer.

† At the time of collecting I did not know the difference between these two species of Datana; judging from the specimens taken they were probably both quite common.

‡ August 24 was the first time I took this moth, and on that evening it was very common.

Agrotis volubilis, *Harv.*, June 14.
" ypsilon *Rott.*, June 17, Sept. 25, Oct. 22, Nov. 2. Common.
" pressa *Gr.*
Mamestra adjuncta, *Boisd.*, June 4, Aug. 13.
" lubens, *Gr.*
" legitima, *Gr.*, July 5, 19.
" subjuncta, *G. & R.* (?)
" trifolii, *Rott.*, May 29, June 15, Aug. 20. Very common.
" renigera, *Steph.*, Aug. 24, 30, Sept. 25. Common.
" lorea, *Guen.*, June 18, 21.
Luceria passer, *Guen.*, June 23, July 3.
Hadena devastatrix, *Brace.*
" arctica, *Boisd.*, June 17, July 21. Common.
" sputatrix, *Gr.*, Aug. 18.
" suffusca, *Morr.*
" mactata, *Guen.*, July 9, 16.
Perigea xanthioides, *Guen.*
Dipterygia scabriuscula, *Linn.*, June 7.
Hyppa xylinoides, *Guen.*, Aug. 24.
Valeria Grotei, *Morr.*, May 29.
Homohadena badistriga, *Gr.*, July 10.
Brotolomia iris, *Guen.*
Euplexia lucipara, *Linn.*
Helotropha reniformis *var.* atra, *Gr.*, July 3.
Apamea sera, *G. & R.*, July 18.
" nictitans, *Wlk.*
Gortyna cataphracta, *Gr.*, Sept. 24.
Achatodes zeae, *Harris.*
Sphida obliquata, *G. & R.*
Heliophila pallens, *Linn.*, Aug. 21, 22. Not seen at any other time.
" albilinea, *Hubn.*, Aug. 10.
" phragmitidicola, *Guen.*, Aug. 10, 12, 19.
Pyrophila tragopogonis, *Linn.*, July 12. Common.
" pyramidoides, *Guen.*, Aug. 10.
Orthodes infirma, *Guen.*
Orthosia ferrugineoides, *Guen.*
" euroa, *G. & R.*, July 16.
Scoliopteryx libatrix, *Linn.*, June 29, July 7.
Cucullia asteroides, *Guen.*, Aug. 24.
" intermedia, *Spey.*, May 28.
Adipsophanes miscellus, *Gr.*, July 9.
Crambodes talidiformis, *Guen.*, May 29, July 3.
Nolaphana malana, *Fitch.*, July 19.
Marasmalus histrio, *Gr.*, July 16.
Abrostola urentis, *Guen.*, July.
Plusia aerea, *Hubn.*
" aereoides, *Gr.*
" balluca, *Gey.*, July 9.
" contexta, *Gr.* (?) Aug. 19.
" Putnami, *Gr.* (?) June 16.
" mappa, *G. & R.*, July 19.
" precationis *Guen.*, May 22, 28, 29, July 15, 21, Aug. 12, 26, Oct. 22. Very common.
" simplex, *Guen.*, May 29, June 21, 25, July 10, 12. Common.
Chloridea rhexiae, *Ab. & S.*, Oct. 20.
Rhodophora florida, *Guen.*, July 8.
Heliothis armiger, *Hubn.*, sept. 24, Oct. 20.
Pyrrhia (angulata, *Gr.* or experimens, *Walk.* ?), June 1, July 1.
Tarache erastrioides, *Guen.*, June 15, Aug. 11.
" candefacta, *Hubn.*, May 30.
Chamyris cerintha, *Guen.*, June 19, 21.
Eustrotia albidula, *Guen.*, June 14, 26.
" muscosula, *Guen.*, June 26, July 21.

Eustrotia carneola, *Guen.*, May 29, 30, June 1, 19, 25, 28, 30, July 1. Very common.
" apicosa, *Haw.*, June 15.
Placodes cinereola, *Guen.*, June 9, 16.
Drasteria erechtea, *Cram.*, July 15, 19, 20, 21, Aug. 10, 11, 18, 20. Very common.
Catocala concumbens, *Walk.*, Aug. 24.
" briseis, *Edw.*, (?) Aug. 26.
" parta, *Guen.*, Aug. 20.
Parthenos nubilis, *Hubn.*, July 9.
Panopoda rufimargo, *Hubn.*
Ypsia undularis, *Drury*, May 23, 29, June 4, 23.
Homopyralis tactus, *Gr.*, June 15.
Pseudaglossa lubricalis, *Gey.*, July 9.
Rivula propinqualis, *Guen.*, June 9, 14, 15.
Phalenophana rurigena, *Gr.*, June 29.
Capis curvata, *Gr.*, July 5.
Hypena baltimoralis, *Guen.*, June 5, 11.
" evanidalis, *Rob.*, July 9, 14.
" scabra, *Fabr.*, Aug. 18.

Geometridæ.

Choerodes transversata, *Drury*, Aug. 12.
Tetracis crocallata, *Guen.*, May 29, June 11.
" lorata, *Gr.*, June 1, 5, 7.
Matanema quercivoraria, *Guen.*, July 9.
" carnaria, *Pack.*, May 29, June 12.
Ennomos alniaria, *Linn.*, Aug. 24. Very common.
Eudalimia subsignaria, *Hubn.*, July 5, 12, 20.
Endropia obtusaria, *Hubn.*, June 24, July 3.
" bilinearia, *Pack.*, July 19.
Endropia armataria, *H. S.*, June 14. Very common.
" hypochraria, *H. S.*, June 8, 14.
Sieya macularia, *Harris*, July 3.
Angerona crocataria, *Fab.*, June 21, 23, 26, 29. Very common.
Nematocampa filamentaria, *Guen.*, May 29.
Plagodis phlogosaria, *Guen.*, July 15.
Hyperitis amicaria, *H. S.*, June 8.
Aplodes Packardaria, *Gr.*, May 23.
Ephyra pendulinaria, *Guen.*, Aug. 22.
Acidalia inductata, *Guen.*, Aug. 11.
" quadrilineata, *Pack.*, June 16, 17.
" enucleata, *Guen.*, July 8, 15.
Stegania pustularia, *Guen.*, July 5.
Deilinia variolaria, *Guen.*, July 9.
Semiothisa ocellinata, *Guen.*, Aug. 11.
Phasiane trifasciata, *Pack.*, Aug. 9.
Lozogramma defluata, *Walk.*, June 17.
Eufitchia ribearia, *Fitch.*, July 3, 8.
Haematopis grataria, *Fabr.*, Aug. 13.
Hemerophila unitaria, *H. S.*, May 29.
Cymatophora pampinaria, *Guen.*, July 21.
Tephrosia anticaria, *Walk.*, July 7.
Eubyja cognataria, *Guen.*, June 11, July 9.
" quernaria, *A. & S.*, May 29.
Hybernia tiliaria, *Harris*, Oct. 22.
Heterophleps harveiata, *Pack.*, (?) June 11.
" triguttata, *H. S.*, June 16, 28, July 16.
Lobophora montanata, *Pack.*, June 4.
Triphosa indubitata, *Gr.*, Oct. 22.
Phibalapteryx latirupta, *Walk.*, (?) July 8.
" intestinata, *Guen.*, May 23.
Rheumaptera ruficillata, *Guen.*
" lacustrata, *Guen.*, May 23, 29.

Ochyria ferrugaria, *Linn.*, Aug. 13.
" designata, *Hubn.*, May 29.
Petrophora diversilineata, *Hubn.*, July 8.
Hydriomena trifasciata, *Borkh.*, July 3, 5.
Epirrita perlineata, *Pack.*, July.
Plemyria fluviata, *Hubn.*, July 12.
" multiferata, *Walk.*, June 15.
Glaucopteryx cumatilis, *G. & R.* June 15.
Eupethecia miserulata, *Grote*, May 28, June 17, 19, 25, July 9. Common.

Pyralidæ.

Asopia farinalis, *Linn.*, June 16, 29, July 1, 21. Very common.
" costalis, *Fabr.*, June 28, 29, 30, July 12, 15, 21, 23, Aug. 9, 12, 24, 26. Very common.
" olinalis, *Guen.*, July 8, 9.
Cordylopeza nigrinodis, *Zell.*, July.
Dicymolomia decora, *Zell.*, June 21, July 5.
Scoparia centuriella, *S. V.**
" libella, *Gr.*, June 28, July 3, 15, 16.
Botys badipennis, *Gr.*, Aug. 11.
" marculenta, *G. R.*
" gentilis, *Gr.*, Aug. 13.
" venalis, *Gr.*, July 5.
" illibalis, *Hubn.*, June 15, July 7.
" plectilis, *G. R.*, June 21.
Nomophila noctuella, *S. V.*, July 6, 9, 15. Common.
Diathransta octomaculalis, *Fern.*, MSS., July 3, June 15.
Desmia maculalis, *Westw.*, June 24, July 16.
Hydrocampa genuinalis, *Led.*, June 12, 15, 16, 18.
" ekthlipsis, *Gr.*, June 15.
Cataclysta fulicalis, *Clem.*, June 14, 15, 21.
" angulatalis, *Led.*, May 29, Aug 11. Common.
Homophysa (—— ?) July 15.
Nephopteryx basilaris, *Zell.*, July.
Salebria fusca, *Haw.*, June 28, July 3.
Anerastia haematica, *Zell.*, June 14, 15, 16.
Euphestia ochrifrontella, *Zell.*, July.
Argyria nivalis, *Drury*, July 15.
Crambus leachellus, *Zinck.*, June 21, July 1, 3.
" agitatellus, *Clem.*, June 21.
" agitatellus *var.* alboclavellus, *Schl.*, July.
" albellus, *Clem.*, June 28, July 3, 21.
" bipunctellus, *Zell.*, July 16.
" topiarius, *Zell.*, July 3, June 14, 23.
" exsiccatus, *Zell.*, May 29; this specimen much darker than the others. June 15, 19, July 3, 20. Very common.
" luteolellus, *Clem.*, July 5.
" ruricollelus, *Zell.*, Aug. 11.
Schoenobius longirostrellus, *Clem.*, July 8.
" clemensellus, *Rob.*, June 15, July 3. Common.

Tortricidæ.

Caccœcia rosaceana, *Harris*, June 19, 20, Aug. 11.
" argyrospila, *Walk.*, July 7.
Loxotaenia clemensiana, *Fern.*, June 14, 23.
Ptycholoma melaleucana, *Walk.*, June 14, 28.
Lophoderus quadrifasciana, *Fern.*, June 28, July 1, 3.

* Very common on June 28, when I saw it for the first time this season; afterwards a few only were seen for a week or two, after which I did not see it again.

Tortrix albicomana, *Clem.*, July 1.
" peritana, *Clem.*, July 8, 9.
" fumiferana, *Clem.*, June 16.
" conflictana, *Walk.**.
Cenopis pettitana, *Robs.*, June.
Dichelia sulfureana, *Clem.*, June.
Conchylis angulifasciana, *Zell.*, June 7.
Eccopsis exoleta, *Zell.*, June 23.
Penthina frigidana, *Pack.*, July 15.
" nimbatana, *Clem.*, July 3.
Sericoris constellatana, *Zell.*, June 14.
Steganoptycha pinicolana, *Zell.*, July 19.
Carpocapsa pomonella, *Linn.*, Aug. 12.

Tineadæ.

Hyponomenta multipunctella, *Clem.* July 3, 21.
Coleophora corruscipennella, *Clem.*, June 29, July 22.

Pterophoridæ.

Oxyptilus periscelidactylus, *Fitch.*, July 1, 3, 5.
Pterophorus marginidactylus, *Fitch.*, June 24, 28, July 1. Common.

COLEOPTERA.

Carabidæ.

Calosoma scrutator, *Fab.*, May 22–29, June 29.
" Wilcoxi, *Lec.*, June 1.
Nebria ——— ? June 14, 15.
Clivina americana, *Dej.*
Nomius pygmæus, *Dej.* July 8, June 14. Very common.
Bembidium planum, *Hald.* July 7.
" patruele, *Dej.*, July 16.
Amara avida, *Say*, July 2, 10, 19.
" obesa, *Say*, July 2, 10.
Diplochila major, *Lec.*, June 14, 16.
Badister pulchellus, *Lec.*, Aug. 21.
Platynus metallescens, *Lec.*, June 15.
" placidus, *Say*, July 16, June 15, Aug. 10.
" obsoletus, *Say*, June 27, July 2.
Lebia grandis, *Hentz.*, Sept. 24.
Brachynus cordicollis, *Dej.*, June 15.
Chlaenius sericeus, *Forst.*, June 14, 15. Common.
" tricolor, *Dej.*, May 29, June 14, July 5.
Agonodorus lineola, *Fab.*, June 14. Very common.
" pallipes, *Fab.*, May 22, June 14, July 5, 7, 10. Very common.
Harpalus viridiæneus, *Beauv.*, June 14.
" caliginosus, *Fab.*, July 16, 25, Aug. 9.
" pennsylvanicus, *DeG.*, July 5, June 14, 15. Aug. 9, 10 11, 12, 20, 24.
Anisodactylus discoideus, *Dej.*, June 1, 14.

Dytiscidæ.

Hydroporus signatus, *Mann.*
Colymbetes sculptilis, *Harr.*, June 14, 11, 24. Very common.
" ——— ? July.
" biguttulus, *Lec.*, June 15, (v. c.) 16, July 2, 3, 5. Very common.
" ——— ? May 22, July 2, 3.

* Saw for the first time on June 28, when it was very common; a few only were to be seen the next three or four evenings, after which I did not see it again.

Dytiscus fasciventris, *Say*, May 22, June 16, July 3, 5, 12, 16, 10, Oct. 22. Very common.
" cordieri, *Aubé.*, July 1, 3, 5, 21. Common.
" Harrisii, *Kirby*, July 5, 19, 21. Common.

Gyrinidæ.

Gyrinus ventralis, *Kirby*, July 3, 5
Dineutes assimilis, *Aubé*, May 29, Sept 23.

Hydrophilidæ.

Hydrophilus glaber, *Hbst.*
Hydrocharis obtusatus, *Say*, July 3, 5, 10. Very common.
Philhydrus diffusus, *Lec.*, July 5.
Hydrocombus lacustris, *Lec.*, July 16.
Hydrobius fucipes, *Linn.*, June 14, 15, 24, July 3, 10.
Cercyon unipunctatum, *Linn.*, Aug. 9.

Silphidæ.

Necrophorus americanus, *Oliv.*, May 29, June 16, 24, July 10, 19. Very common.
" orbicollis, *Say*, June 25, July 19.
Silpha surinamensis, *Fab.*, May 22, June 1, 2, 8, 25, July 1, 19, 20, Aug. 23. Very common.

Staphylinidæ.

Bledius semiferrugineus, *Lec.*, June 14, July 8, Aug. 9. Common.

Coccinellidæ.

Adalia bipunctata, *Linn.*, July 19.

Mycetophagidæ.

Typhœa fumata, *Linn.*, Aug. 9.

Dermestidæ.

Dermestes lardarius, *Linn.*, Oct. 22.
Attagenus megatoma, *Fab.*, July 6.

Lathridiidæ.

Corticaria pumila, *Lec.*, (?) July 16 to Aug. 20. Very common.

Elateridæ.

Alaus myops, *Fab.*, June 14.
Melanotus communis, *Gyll.*, June 9, 26, July 1, 2, 10, 15, 21. Very common.
Athous cucullatus, *Say.*
Asaphes memnonius, *Hbst.*, July 1, 3, 10. Very common.

Lampyridæ.

Pyropyga nigricans, *Say*, July 9.
Photuris pennsylvanica, *De G.*, June 23, July 2.
Podabrus basilaris, *Say.*
" modestus, *Say*, June 29.

Ptinidæ.

Trypopitys serviceus, *Say*, July 15.
Bostrychus bicornis, *Web.*

Cupesidæ.

Cupes capitata, *Fab.*, Sept. 24.

Lucanidæ.

Lucanus dama, *Thunb.*, July 10.
" placidus, *Say.*
Passalus cornutus, *Fab.*

Scarabæidæ.

Copris anaglypticus, *Say*, June 14, 15. Common.
Aphodius granarius, *Linn.*, June 14, May 29.
Odontaeus cornigerus, *Melsh.*
Trox porcatus, *Say*, June 14.
" aequalis, *Say*, June 14 (v. c.)
" striatus, *Melsh.*
Dichelonycha linearis, *Schon.*, May 29.
Lachnosterna fusca, *Froh.*, May 29, 22, 31. Very common.

Lachnosterna cognita, *Burm.*
Pelidnota punctata, *Linn.*, July 3.
Cotalpa lanigera, *Linn.*, May 22, 29, 31, June 1. Common.
Ligyrus relictus, *Say*, Aug. 9.
Xyloryctes satyrus, *Fab.*

Cerambycidæ.

Criocephalus agrestis, *Kirby*, June 28, 27, July 10. Very common.
Chion garganicus, *Fab.*, June 14.
Xylotrechus colonus, *Fab.*, July 5.
Centrodera decolorata, *Harr.*, June 14.
Monohammus confusor, *Kirby.*
Urographis fasciatus, *De G.*, June 14.
Eupogonius vestitus, *Say*, July 16.
Saperda calcarata, *Say*, July 3.
" vestita, *Say*, June 14.
" tridentata, *Oliv.*, June 14, 15, 16. Common.

Chrysomelidæ.

Diabrotica vittata, *Fab.*, Sept. 24.

Tenebrionidæ.

Tenebrio molitor, *Linn.*, June 14, July 2, 5. Very common.
Hoplocephala bicornis, *Oliv.*, June 14.

Cistelidæ.

Allecula nigrans, *Melsh.*

Pythidæ.

Salpingus virescens, *Lec.*, July 5.

Anthicidæ.

Notoxus anchora, *Hentz.*

Curculionidæ.

Listronotus caudatus, *Say*, June 14.
" appendiculatus, *Boh.*, June 14.
Pachylobius picivorus, *Germ.*, June 14.
Hylobius pales, *Hbst.*, June 15.

Anthribidæ.

Cratoparis lunatus, *Fab.*, June 16.

ORTHOPTERA.

Platyphyllum concavum, July 16.

HYMENOPTERA.

Ophion bilineatus (?) May 29. Common.

DIPTERA.

Stomoxys calcitrans.
Chrysops striatus (?)

NEUROPTERA.

Corydalis cornuta, June 26, 30, July 5.
Chauliodes pectinicornis, May 29, June 1, 16, 25, July 21, Aug. 11, 19, 20, 24.
Neuronia postica (?) May 29, June 14, July 1, 9.

HEMIPTERA.

Camptobrochis grandis, May 22, 31, June 1, 9. Very common; afterwards a few seen occasionally through June, July and August.

NOTE ON HEMARIS UNIFORMIS AND ARCTIA SAUNDERSII.

BY A. R. GROTE, BREMEN, GERMANY.

I have sufficiently shown in various places (and the enquiring student may consult the originals) that Kirby's description of *Ruficaudis* contradicts that of *Uniformis*, in what we must regard as essential particulars in this genus. We have not here to do with a species; but, according to Mr. Hulst's statements, with a dimorphic form of *Thysbe*, in which the inner margin of the terminal band of primaries is *even*, not *dentate*, on the interspaces. Now this character is not at all alluded to by Kirby. He describes a *Sesia* allied to the European, and he says and knows nothing about *Thysbe* or *Pelasgus* or *Cimbiciformis*. Kirby should not have described *Uniformis* without comparing it with its ally—its other well known form. Notwithstanding the probabilities of the case or the possibilities, it never can be proved from the books that Kirby did describe *Uniformis* as *Ruficaudis*. This is a matter of scientific importance, because we are the first to point out that two distinct "forms" if not "species" were passing as *Thysbe*, the differences which constantly divide them being first pointed out by us, first used as the basis by which they can be correctly separated and named in collections. It is therefore no matter of simply restoring an older name. It is an attempt at construing an older name and one which does not really apply. The attempt is therefore to be deprecated as unscientific. The whole point lies in the separation of the forms passing current as "*Thysbe*." In this lay the scientific value of the writings of Mr. Robinson and myself. This discovery, important or not important (real it certainly is), was made by us and is covered by the designation we apply to the plain form, and, according to all sense and the principles of scientific nomenclature, this name should henceforward apply. Clemens does not recognize *Ruficaudis;* Fernald mentions our insect as "*Uniformis;*" I take it for granted that these or similar considerations have influenced his course. It is years and years ago since I studied Kirby in the original, at least fifteen years before Mr. Hulst's time. It needed not that this industrious, but in his earlier studies somewhat inconsiderate writer, should tell *me* of the probabilities of what Kirby's might be. At the best they are probabilities. I take it, that to be correct, scientifically correct, the form of *Thysbe* with *even* edge to the external band of primaries and of the same or similar size with the type,

should be called *Uniformis* G. & R., without any reasonable doubt. I will not enter here into the question of the even banded forms, *Buffaloensis* and *Floridensis*. The larva of the former is described by Professor Lintner. The latter has not been examined in sufficient quantity. I think now that both these forms are distinct, certainly sufficiently so as to merit a distinct title, if not of specific value. *Fuscicaudis*, Boisd., is, from the markings of the abdomen, certainly a distinct species. After myself examining specimens I can come to no other conclusion.

Quite similar arguments show that we are justified in calling the smaller of the two forms of *Arctia*, which have buff striped, black fore wings, and red, spotted secondaries, by the name *Saundersii*. I carefully considered Kirby's description of *Parthenice* after my discovery that two species were passing as *Arctia virgo* in collections. The character which separates the two is the narrower ochre veining of *Saundersii*. Again as with the *Hemaris*, Kirby fails to compare his species with *Virgo* Linn., which it was his business to know had he intended to describe as closely allied a species as *Saundersii* is. I pass by the probably correct surmise of Mr. Hy. Edwards that Kirby describes an unimportant variety of *Virgo*, assuming this author to be correct. But be this as it may, I am the first to scientifically separate the forms, to carefully describe them, to figure them side by side (at my own expense, which was a good deal in those days), to give the essential characters by which they may be known and named henceforth. This being so, it is inconsiderate, and, scientifically speaking, an erroneous view which would overturn this real work and restore a name which can never be proved to be correctly applied. Always there must be a doubt hanging over the name *Parthenice*, from Kirby's own fault in ignoring *Virgo*. But there is no doubt about *Virgo* or *Saundersii*. I cleared those doubts up years ago, and Mr. Hulst should have profited by my work rather than attempt to re-introduce the uncertainty which I had, I think properly, dissipated.

ELAPHIDION VILLOSUM, Fabr.

BY FREDERICK CLARKSON, NEW YORK.

In support of the record relating to the periods of transformation of this beetle, and the probable cause of their pruning the branches of the Oak, which I had the pleasure to contribute to the XVII Vol. of this

journal, I now add some further facts, resulting from a recent visit to Clermont, N. Y.

On the 29th of October I gathered from under a group of *Quercus tinctoria*, seven branches that had been pruned by this longicorn. The tunnels were from ten to fifteen inches long, in branches from one-half to three-quarters of an inch in thickness. The branches I carefully divided lengthwise, so that the parts could be replaced in position. Six of them contained the pupa, one the larva, which pupated November 4th. One of the pupæ I preserved as a specimen. The imagines appeared on the following days: Nov. 14th, 22nd, 26th, 29th, Dec. 9th and 25th, all females.

These transformations were rather hindered than advantaged by meteorological conditions, for they occurred in a room having a northern exposure, in which, during the period of the transformations, the thermometrical record differed but little from that in the shade without. Had the branches remained upon the ground, the included insect would have received all the benefits resulting from the direct rays of our Indian Summer's sun, as well as the moisture from the ground; influences that ordinarily assist development. As the imagines appeared they were examined and replaced in their tunnels, where they now remain in a passive state, and not likely, I think, to exhibit their natural activity until next May or June.

The object of the paper referred to, as well as this article, is to present facts that seemingly disprove certain theories relating to the habits and metamorphoses of this beetle, which have been formulated by distinguished sires and accepted by their credulous sons. What Drs. Peck, Fitch and Harris have written upon this subject has been substantially repeated by almost every entomologist who has undertaken a history of this beetle. We are very apt to fall into line when we have an abiding confidence in a leader. While I am unwilling to deny the conclusions of these naturalists, I yet think that the facts related go to show that the insect matures at a period earlier than that named by them, and that the benefits supposed to result from the dismemberment of the branch, in so far as the changed environment is concerned, are wholly unnecessary to the development of the included insect, and that there is a plausibility in the inference, if not a certainty as to fact, that the object of pruning the branch is to prevent the flow of sap. If the habits of this beetle as given by these doctors are to be regarded as *ipso facto*, then we must admit the

possession of a faculty in these lower organisms that towers above instinct and presents the feature of intelligent reason. This is a subject that cannot very well be discussed in these pages, yet it may not be out of place to say that able writers on the question very generally admit that the habits of insects follow a prescribed law, by some regarded, in a materialistic sense, as mechanical; and by others, spiritually considered, as in furtherance of a divine edict. This latter view is very cleverly presented by St. George Mivart, in Organic Nature's Riddle: "Our experience," he writes, "is in favor of the existence of an intelligence which can implant in and elicit from unconscious bodies activities that are intelligent in appearance and result . . . . . 'Unconsciously intelligent action,' improperly called 'intelligent,' is that which is called intelligent only as to its results and not in the innermost principle of the creatures which perform such actions." "Instinct," Todd says in his Cyclopædia of Anatomy and Physiology, "is a special internal impulse urging animals to the performance of certain actions which are useful to them or to their kind, but the uses of which they do not themselves perceive, and their performance of which is a necessary consequence of their being placed in certain circumstances."

If such definitions are accepted, how are they to be reconciled with the marvellous statement as given by Dr. Fitch? That the larva should prune the branch to prevent the flow of sap would be a necessary consequence of its being placed in certain circumstances, but to do so that the branch may fall to the ground presents a course of reasoning that relates to a condition foreign to the then existing environment. The habits of this beetle from the period of egg-hatching, as given by Dr. Fitch, displaying as it did to him extraordinary intelligence, impress me as presenting the most natural instinctive qualities. The ova, he says, is deposited on a small green twig, the soft pulpy tissues of which nourish the infant larva, which when increased in size and strength, attacks the hard wood of the branch, transversely, in a circular direction, consuming it all, leaving the branch supported only by the bark. From these premises, without pursuing the subject further, it is evident that the infant larva requires sap-wood for its sustenance, which it derives from the twig, but so soon as its strength permits, it seeks for dead-wood by attacking the branch, which is found more and more free from sap as the work of severance progresses. The aim therefore from the start is to obtain the dead-wood,

and when the branch is eaten through the larva continues its feeding in forming a tunnel through that portion of the branch which is cut off from the supply of sap.

The instinct of insects is wonderful enough, and more accurate perhaps than a mental process, but while we justly ascribe to them all the attributes pertaining to their natural gift, we are not warranted in imputing to them an intelligence only to be arrived at through a course of reason.

BOOK NOTICE.

THE BUTTERFLIES OF NEW ENGLAND, with original Descriptions, accompanied by eight lithographic Plates, in which are given at least two hand-colored Figures of each Species. By C. J. Maynard. Boston, Bradlee Whidden, 1886.

The author of this work is a well-known taxidermist and ornithologist, who here endeavors "to present recognisable figures and intelligible descriptions of the Butterflies," etc. The drawings and descriptions, he says, are original, but he has been obliged to compile descriptions of the larva and pupa from works of various authors, and is indebted to such works for many notes upon habits, distribution, etc.

He has coined a new set of names for the veins of the wings, and likewise a set of English names for the several species. No authority follows the specific names in the text, but those "who are curious to learn who first described any given species, can ascertain by referring to an Index," etc. He sees no reason why polymorphic forms, which he calls "phases of coloration," should receive names, and in this connection thinks that entomologists have overlooked the results of an important law, that of reversion. The classification adopted is that used in the arrangement of the collection of the Boston Soc. N. Hist., "merely because of its simplicity," and hence the series begins with the Satyridæ, and Papilio stands next the Hesperidæ. By all which it will be seen that the author has ideas of his own, but is not very well read in the recent literature of lepidopterology.

The plates are described as hand-colored, and it seems to be implied that the coloring therefore is something superior. Whereas it is very bad indeed—could not well be worse. This is conspicuously so in Limenitis,

Vanessa, Grapta, Argynnis, and Euptoieta. Papilio *Troilus*, plate 7, is simply atrocious. I doubt very much if any one not familiar with the butterflies could identify several of the species of Thecla from the figures, and I am sure they could not identify many of the Hesperians. And the drawing is of the roughest.

In giving a title, the author should have respected the claim of Mr. Scudder, who, as all the world knows, has been engaged for years on "The Butterflies of N. E.," and is about publishing the same.

Whenever in this book larvæ or habits are treated of, there are pretty sure to be errors, both of commission and omission, and this is inexcusable, as in nearly or quite every instance, careful descriptions of the preparatory stages and habits were or could have been before the compiler. The result is such as to destroy largely any value the text might have. Thus:

Under *N. Canthus*, we are told that the larvæ are green. Now there are green larvæ, but so far as has been observed, the larger number are buff. See CAN. ENT., xv., 64. Also it is said of this species that the larva moults three times in fall, then hibernates, and moults three times in spring. No butterfly larva moults six times, and those treated of vary in habit. Some moult twice and hibernate, then three times in spring, while other larvæ go to pupa in one season with but four moults.

Of *N. Eurytris*, we read: "Larva not dissimilar to that of *Alope*, but smaller." There is no near resemblance whatever between the larvæ of these two species in any stage, but a great and generic difference.

Of *D. Archippus*, we read that the larvæ moult three times, whereas they moult four. See Psyche, ii., 53.

Of *Arg. Cybele:* "The earlier stages of this species are not very well known. The larvæ have been kept in confinement by Mr. Edwards, and moulted five times, and during the winter went into the chrysalis state." I gave full account of all stages of the larva, CAN. ENT., xii., 141, and therefore the early stages are very well known, and a life history, vol. vi., p. 121; and the pupation took place, not in winter, but in May.

L. Disippus: Larva described as having a horn on second ring, and on third, fifth, etc., a spiny process each, the eleventh with two short spines. Now every ring mentioned here has a pair of processes instead of a single one. In the account of the habits of this species, not a word is said of the case made by the larva for hibernating. On the contrary, we have the incorrect statement that the larvæ remain in pupa all winter.

The most remarkable thing in the history of North Am. butterfly larvæ is the making these cases by all the species of Limenitis, and it would seem incredible that the merest collector should not have known that. How comes it then that no mention of such a habit should be found in a work professing to have been written for instruction of beginners? Nothing is said under *Ursula* of such cases, but under *Arthemis* we are told that the larvæ "construct a case of leaves," instead of a case from a single leaf. Moreover the larvæ of these three species of Limenitis are described as regards the processes on them as if they were radically different from each other, whereas they are all built on the same pattern, and where one has a process all have a similar one.

Of Argynnis *Myrina*, we read that the larvæ moult three times. Now the larvæ of the early brood moult four times, and of the late brood, five. C. ENT., vii., 189.

Under Mel. *Phaeton*, we read that these butterflies have restricted areas, living in peaty meadows, and that the larvæ make a web, but no mention is made of the food-plant, Chelone glabra, which grows in such meadows or in swamps, and is the reason for the presence of the butterflies there.

Under Thecla *Irus*, we read that Mr. Edwards says the eggs are laid on wild plum, etc., "very interesting," etc. I said nothing of the kind. My account was of *T. Henrici*, and I expressly said that I could not get *Irus* to lay on plum.

Under Lyc. *Pseudargiolus*, Mr. Edwards is quoted as saying that hibernating larvæ produce typical *Pseudargiolus* in spring. On the contrary, the larvæ in no case hibernate, but the pupæ do, some to produce *Violacea*, some *Pseudargiolus*.

Of Fenesica *Tarquinius*, we read that the larvæ feed on wild currant, whereas they feed on aphides only.

Of Anthocharis *Genutia*: "There are two broods in the season, the first of which appears in July." There is but one brood in the year, and the chrysalis hibernates. The early butterflies, from these chrysalids, appear at Newburgh, N. Y., early in May. Doubtless just as early in Conn., which is given as their N. England habitat.

Of Papilio *Troilus*: "The larvæ spin a little roof over the leaf, drawing the edges together." That might do for Pyrameis *Atalanta*, but not for *Troilus*. The larva, as soon as out of egg, cuts into the border of the leaf about one tenth inch and draws the part over, holding it down by a

few threads. The nearly mature larva turns over the side of the leaf, and loosely stitches down the edge, but there is at no time a roof spun, nor is there any roof except what the turned leaf makes.

Such a list of blunders shows heedless and ignorant compiling. Another class shows want of knowledge of the butterflies. Thus, *D. Portlandia* is compared with *N. Canthus*, "which it resembles quite closely." It has but a very distant resemblance to *Canthus*, differing in size, shape and markings. So *Portlandia* is compared with *N. Eurytris*, just as erroneously as in the other case.

As to polymorphism, the phenomena are ignored everywhere, and the names of the forms often, as per Preface, but sometimes the names are given.

It certainly is proper that such a remarkable peculiarity in the life history of a species should be recognised, and the different forms indicated by name. Indeed they are by lepidopterists. Often they are more distinct from each other than are many allied species. "Mr. Sprague informs me that the first brood of *G. Comma* is dark in color, while the next is lighter." What Mr. Sprague means is this, that the brood proceeding from eggs of the hibernating butterflies (form *Harrisii)*, is the dark or summer form *(Dryas)*, and the late brood, from eggs of *Dryas*, is *Harrisii*. "I think however that specimens having the peculiar rusty under surface to the wings are confined to particular localities, hence, judge that perhaps different food plants produce varying color." Now these rusty examples are the females of the form *Dryas*, this species being in the summer form sexually dimorphic, as well as seasonally. I have repeatedly showed the distinction between the two principal forms of *Comma*, Can. Ent., vi., 157; x., 69; xiv., 189. Also in But. N. A., vol. 1, a plate is devoted to each form, and each sex is figured on both surfaces. The dimorphism of both sorts is universal wherever *Comma* is found, and food has nothing to do with it, more than has locality.

Under the head of *G. Interrogationis*, we are told that there are two broods, in June and September, and that "Mr. Edwards states that he has raised both forms *Fabricii* and *Umbrosa* from one brood of larvæ, but that Mr. Sprague, who has had a wide experience with our native species, informs me that he has invariably found the dark form is the early or summer form, and the lighter the later. Consequently very early in the spring he has caught *Fabricii*, this being the autumnal form which hibernates." The dark form is *Umbrosa*, the name indicating the color, and is the pro-

duct in New England as elsewhere of the form *Fabricii*. Our author proceeds: "The reason for this variation" (that is, between the dimorphic forms) "is difficult to explain, as neither food nor atmospheric change appear to have anything to do with it, for we find that Mr. Edwards has produced both forms where the larvæ were found under precisely the same circumstances." Both the forms spoken of are figured in But. N. A., vol. 1, and the life history at Coalburgh is given at length. Also in C. E., x., 73, and xiv., 201. I gave the result of many years observations at Coalburgh on this species, stating that all the hibernating butterflies had been *Fabricii*, except in a single instance; that the eggs laid by females of this early *Fabricii* produced a mixed brood, the large majority of individuals being *Umbrosa*. And eggs of *Umbrosa*, of this mixed brood, again produced a mixed brood, the large majority still being *Umbrosa*. But that eggs of these last *Umbrosa* had produced *Fabricii* only, late in the year, and these were hibernators. At the north, where there are two broods only, the dimorphism is complete, and this is the case with all seasonally-dimorphic species of butterflies, which are also only two-brooded. But at the south, or where the length of the warm season permits one or more additional broods to mature—and these seem to be inserted between the two original ones—the result in such additional broods is a mixture of the two forms. But in the case of *Interrogationis*, there is a preponderating tendency towards the summer form, *Umbrosa*, imperfectly counteracting the inherited tendency of the species to produce the winter form *Fabricii*, as it would in New England.

These results are not only interesting but biologically very important, and the forms are not to be regarded as simple variations. Food has nothing to do with dimorphism, nor has atmospheric change, but climate has. Vide Weismann, vol. 1. In my paper referred to, CAN. ENT., x., p. 73, I offered a conjecture that at the north, *Fabricii* would be found to be the winter form and *Umbrosa* the summer, and expressed a hope that some lepidopterist would examine into the matter and report. If Mr. Sprague has made the necessary observations, I hope he will publish them.

Under Melitaea (Phyciodes) *Tharos*, we are told that the larvæ of first brood give the "butterflies known as *Morpheus*," while the larvæ of the second hibernate, to produce "the butterfly known as *Myrina*," in June. That is a mistake for *Marcia*. But here again the names of the forms had to be used to make the story intelligible.

Satyrus *Alope* is given as one species, *S. Nephele* as another, though

both are but dimorphic forms of the same species, as I have set forth in C. E., xii., 21. In B. N. A., vol. 2, two plates are devoted to these forms and varieties, and the whole history is given. It is a very curious history too, and one not to be neglected in a work meant for instruction.

A particularly objectionable feature of the work in hand is the manufacture of English names for the species, one and all. The custom of applying such names will never become general in this country, and fortunately. In Europe, before the binomial nomenclature was invented, it was natural that there should be local names for such striking objects as butterflies. A few, some half dozen, European species have become domesticated on this continent, and I have noticed that Americanized English collectors are fond of recalling the vernacular names they knew at home. But even these names have nowhere come to be used commonly here. Some of our authors, however, have exerted themselves to fix such names on all the American butterflies, and the result is fantastic. The greatest sinner in this respect, I regret to have to say, is Mr. Scudder, but as he has lately announced, Science, No. 194, that he regards all names as necessary evils, it would seem to follow that a superfluity of names is an unnecessary evil; therefore I hope to see these appendages dropped in his forthcoming work. No one but the contrivers use them; they do not stick to the insect. No better illustration of this could be offered than in Mr. Maynard's book. What Mr. Scudder calls Blue-eyed Grayling, the other calls the Yellow-spotted Wood; what one calls Eyed Brown, the other Ten-spotted Quaker! what one calls The Viceroy, the other the Banded Red; what one calls the Great Spangled Fritillary, the other the Yellow-banded Silver Wing. Now the butterfly last spoken of is known as Argynnis *Cybele*, the name a beautiful one, by the side of which the appellations above given are as tawdry as they are long-winded. So all through. It is best in Entomology, as in every other kind of learning, that beginners begin right, and as every species has its proper specific name, by which it is universally known, and of which it can never be divested, no elementary work has a right to teach otherwise.

The descriptions of the insects are well enough, except as to the nerves of the wings. These organs have ages ago received names which have been accepted, and there is no reason whatever for changing them, especially in a work of the character of this one. "Middle" is no more simple than "median," and means the same thing; "upper vein" instead

of "sub-costal" is misleading, in fact wrong, because the uppermost vein is the costal.

And the arrangement of families was adopted "merely because of its simplicity," but wherein that consists it would be hard to discover. It is not a natural arrangement; if it was, the Satyridæ would next precede the Hesperidæ. However there has been a fashion these last years for artificial grouping of the butterflies, and our author is not without reputable company in his choice.

In conclusion, the illustrations in this work, poor as they are, will answer some purpose; the text, so far as it is incorrect, is worse than nothing. The field is still open for a well-illustrated book on the same butterflies, written by one who is acquainted with his subject.

W. H. EDWARDS.

CORRESPONDENCE.

ON THE GENUS QUADRINA.

Dear Sir,—I notice the remarks of Mr. Smith, in "Entomologica Americana" (vol. ii., 1886, page 124), merely to state that in my original description I comment upon this singular genus and say that "it may be catalogued next to *Gloveria*." I further regard its affinities to the *Ceratocampidæ*, and I intended to place it with this group in my catalogue. By a mistake of the printer it was thrown into the preceding group. It is clear that I regarded the insect as allied to *Citheronia*, and Mr. Smith's remarks as to *Hemileuca* are uncalled for. I say distinctly, "altogether it is removed from *Coloradia*" (Papilio, I., 175). In fact, I regard *Quadrina* as the remains of an old type, synthetic, in that it embraces characters of existing sub-families of the *Bombycidæ*. It is an example of what I have called attention to, viz., the existence in America of older types than elsewhere, such as the *Paleohesperidæ* of my classification. I am decidedly opposed to the idea that *Quadrina* is a Cossid. I regard it as a type between *Gloveria* and *Citheronia*. I classed it with the Ceratocampians. We know neither the male nor the larva. It is premature to be exact as to its location. It may well afford a new sub-family type. I feel confident that the larva will be an external not an internal feeder. It may point to the way in which the Ceratocampians and the internal feeders with similar habitus are phyllogenetically related.

A. R. GROTE, Bremen, Germany.

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DESCRIPTION OF THE PREPARATORY STAGES OF COENONYMPHA AMPELOS, Edw.

BY W. H. EDWARDS, COALBURGH, WEST VA.

Egg.—Conical, truncated, the top nearly flat, slightly depressed, covered with a fine network of irregular six-sided meshes; these form four rings about the central rosette, in middle of which is the micropyle; the lower part and base rounded and thickly covered with shallow indentations; the sides ribbed, the number of ribs about 34, vertical, slightly sinuous, more so at lower end, narrow, with rounded spaces between, which are crossed by many fine lines; color yellow-green. Duration of this stage about 12 days. The egg is like that of *Galactinus*, but has fewer ribs.

Young Larva.—Length, at 24 hours from egg, .11 inch; cylindrical; thickest at 2 to 4, tapering on dorsum and sides to 13, ending in two short, conical tails, which meet at base; color pale yellow-green; a mid-dorsal reddish line, and three similar lines on the side, the upper one sub-dorsal, the lowest running with the spiracles, and the middle one nearer the lowest; surface covered with fine white tubercles, which give appressed downy hairs; among these are white clubbed processes, all bent back, except those on 2; these form three rows on each side, one sub-dorsal, a mid-lateral, with a demi-row on 2 to 4 between the long rows; in all these one process to the segment; the third row is at base, over feet and legs, two processes on each, from 5 to 11; one each on 3 and 4; on 2, 12, 13 two hairs to each, in place of processes; these lower processes are smaller, and turned down; head one half broader than 2, rounded, narrowing toward top, a little depressed, granulated; over the face a few white tubercles with processes as on body, bent down; color pink-brown. Duration of this stage about six days.

The young larva is in all respects like *Galactinus*, except slight differences in coloration.

After First Moult.—Length, at 18 hours from moult, .2 inch; nearly same shape; color yellow-green; surface thickly beset with white tubercles, and downy; a mid-dorsal green line, three similar ones on side, the two lower nearest together, the lowest being next over the basal ridge,

which is light yellow ; ends of tails pink ; under side, feet and legs green ; head sub-globose, depressed at top, the surface much covered with white tubercles and hairs ; color green. Duration of this stage about 11 days.

After Second Moult.—Length, at 24 hours, .3 inch ; shape as before ; color more green than yellow ; dotted as before with white tubercles ; tails rough with tuberculations, reddish ; stripes as at last previous stage, the two lateral less distinct ; the basal ridge yellow ; head emerald, tubercles as before. To next moult 6 days.

After Third Moult.—Length at 24 hours, .42 inch ; in six days, one larva of the brood was full grown.

Mature Larva.—Length .7 inch ; cylindrical, a little thickest anteriorly, dorsum and sides sloping very gradually, the former to 10 and then rounding to 13, ending in two conical, short, stout tails, which meet at base, and are rough with tuberculations ; whole surface covered thickly with fine rounded white tubercles, each of which gives out a fine short hair, making a downy coating ; these hairs are clubbed, or tapering, or cylindrical ; color dark green, the sides yellow-green ; the tails reddish ; a mid-dorsal darker green stripe ; on the sides traces of two stripes (the sub-dorsal having disappeared) ; the basal ridge light yellow ; under side, feet and legs green ; head broader than 2, sub-globose, a little depressed, beset with white tubercles and hairs, the surface finely granulated ; color yellow-green, the principal ocellus emerald in brown ring. From third moult to pupation 10 days.

After Fourth Moult, after hibernation.—Length .49 inch ; not differing in color or markings from third summer moult.

Chrysalis.—Length .4 inch ; greatest breadth, at mesonotum, .12, at abdomen, .14 inch ; shape of *Galactinus ;* cylindrical, stout, the upper end truncated, the abdomen swollen, conical at extremity ; head case narrow, ending in a sharp cross ridge which is a little arched, the sides excavated roundly ; mesonotum prominent, arched, the carina rounded transversely, the sides slightly convex, followed by a shallow depression ; color delicate green ; marked by nine black stripes placed as in *Galactinus ;* of these, one on dorsal edge of each wing case from base to inner angle of wing ; a curved stripe on middle of each wing reaching the hind margin ; a short stripe on same margin on ventral side of the curved one ; two short stripes on the antennae cases ; besides these, there is a black mark on either side of 13 ; top of head case whitish. Duration of this stage

10 days. Whole period from laying of egg to imago, in summer, 49 days, of which the egg was 12 to 13, larva 25 to 26, chrysalis 10.

After the second and third moult, which took place last of June and early in July, all the larvae but the one which went to pupation 30th June, became lethargic, and evidently would hibernate. I put four of these on ice, 26th July, and nine others, 4th August, to see if some weeks of that treatment would not serve for their resting period as well as the entire winter, with ordinary exposure. On 23rd August, I brought in one of the first lot, on ice four weeks. This had passed three moults. On 24th, it began to eat; on 26th, was .48 inch long; grew slowly and eat at long intervals. By 20th Nov., was .56 inch; and passed the fourth moult 2nd December. On 30th Dec., pupated. The pupa I put in alcohol. Another larva passed 4th moult, 6th January. Another same, 17th February. This last pupated 23rd May, and gave imago 3rd June. So that the exposure on ice, though it more or less fully aroused the larvæ, does not seem to have shortened the hibernating period, except in case of the single one which pupated 30th December.

The eggs of *Ampelos* were sent me by Mr. James Fletcher, then at Victoria, V. I., and were laid 22nd May, mailed 23rd, and reached me 3rd June. The first larva hatched 4th June.

On 21st June, I received a second lot, or rather, young larvae just hatched, and two eggs. These were laid on 9th and 10th June, and were mailed 11th. In both cases the females which laid the eggs were sent.

There seems to be no dimorphism in this species. The butterflies which came from chrysalis with me did not differ from the parents, and examples sent, taken in May and in August, were of the one type. Mr. Fletcher informs me that this was his experience. This species is of the size of *C. Ochracea* (smaller than *Galactinus*), of a paler color; the under side of hind wings gray brown, sometimes paler beyond disk, sometimes of one shade from base to margin; with an interrupted, irregularly crenated band across disk; with no other mark, no spot towards base, no ocelli or spots along hind margin (all these spots are characteristic of *C. Ochracea*). Mr. Fletcher writes: "I have never succeeded in finding an ocellus, and I am sure I have examined hundreds of examples." He also adds that the species is extremely abundant at Victoria.

Ampelos was described by me, 1871, in Tr. Am. Ent. Soc., from a pair received from Oregon. So that it probably is found at least from Oregon

to Victoria, and also probably west of the Cascade Mountains. I have not seen it from California, or other region.

The larvæ of this genus are exceedingly sluggish, in confinement resting on the grass stems or leaves, and scarcely moving except when the supply of food fails. They are easily bred. I am now feeding larvæ of *C. Ochracea*, and will in due time give report of it. I wish some one in the North-west, interested in these things, would send me eggs of *C. Inornata*, a dark brown, or brown-ochre species, with black-brown under side, found along the northern boundary of the U. S. in Dacotah, and in Brit. Am., on the prairies. Eggs can readily be had by confining females over grass in box or fruit can.

NOTE.—In my paper on the stages of *C. Galactinus*, vol. xviii., p. 201, the measurement of the mature larva should read .84 inch (not 1.06 inch).

ON THE GENUS RICHIA.

BY A. R. GROTE, BREMEN, GERMANY.

After examining the European *Ammoconia caecimacula* (in which the ♂ antennæ are dentate and furnished with pencilled setae or hair; the form stout; the tibiae, of the middle and hind legs only, spinose; the thorax and abdomen with slight dorsal tuftings), I find that my species are not congeneric, and I accordingly refer them to this genus named in memory of a Brooklyn Entomologist, Harvey J. Rich, who died while yet young, and whom I knew "before the war." The type of *Richia* is *Chortalis*, and its probable dimorphic form *Aratrix*, though we do not know quite surely whether the two are so related or not; they occur over the West and Southwest, to Texas. A second species is the Texan *R. sculptilis* of Harvey, a fine Noctuid. A third is my *Decipiens*, with its red form *Parentalis*, figured in my Essay. These differ by the untufted abdomen, spinose fore tibiae, the thorax having a *ridge* of hair (well shown in my figure, Plate 1, 13), as also by less robust form, agreeing with *Agrotis*. The genus, in fact, is not a Hadenoid form, and I refer to my paper on *Agrotis*, CAN. ENTOM., xv., 54, for my views as to its position.

I remember determining a fourth species from the West, and others doubtless will be found. At present I would thus arrange them:

Genus *Richia* Grote.

Chortalis *Harvey*.
dim. var. aratrix *Harv.*
sculptilis *Harvey*.
decipiens *Grote*.
var. parentalis *Grote*.

LIMOCHORES PONTIAC AND ATRYTONE KUMSKAKA.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

In 1863, Mr. W. H. Edwards described a male Hesperian from Michigan under the name of *Hesperia Pontiac*, closely resembling the species figured by Boisduval and LeConte, under the name of *Arpa*, as well as the larger Florida species Edwards subsequently described under the name of *Pilatka*. In the same paper in which *Pontiac* was described and immediately preceding it, he described, also from Michigan, a female under the name of *Hesperia conspicua*. These two forms were subsequently figured in the same volume (II.) of Proceedings of the Entomological Society of Philadelphia, and were recognized as the male and female of the same species, after Prof. H. W. Parker had re-described the male (Can. Ent., III., 51), referring it to *H. conspicua*. In his since published lists, Mr. Edwards has classed them as one species under the preferred name of *Pontiac*.

In connection herewith I have made two mistakes: First, in identifying in 1868 an Iowa species as *conspicua* and describing the proper male of the same as the then supposed unknown male of *conspicua* (Trans. Chicago Acad., I., 336); and second, the re-description, very briefly, of *Pontiac* under the name of *Hedone Orono* (Syst. Rev. Am. Butt., 58), being led astray by my supposition with regard to the Iowa butterfly. I have since given the Iowa butterfly, which belongs to *Atrytone*, the name *Kumskaka*, in naming it for others; but as this name has not been published, nor the species fully described, I append herewith a full description of the same.

The two butterflies concerned belong to two different genera, one of which (*Limochores*, to which, and not to *Hedone*, *Pontiac* belongs,) has a sexual, velvety dash or stigma on the front wings of the male, wholly wanting in *Atrytone*, and they can thus be readily distinguished.

ATRYTONE KUMSKAKA.

Hesperia conspicua, Scudd. nec. Edw.

Head covered above with mingled greenish-yellow and blackish hairs, the former in excess; on the inner and outer side of the bases of the antennæ a tuft of black hairs; encircling the hinder part of the eye a series of pale yellow scales; palpi pale yellow, with a very slight greenish tint, shading into pale orange toward the tip and there interspersed with a

few black scales, which on the upper surface supersede the others; last joint black; antennæ black, annulated broadly below, narrowly above, at the base of each joint with glossy, pale lemon-yellow scales, which on the base of the stem are merged into a common bright patch; club, excepting as just stated, black; the crook dull castaneous to the very tip.

Thorax covered above with mingled greenish-yellow and brownish hairs, the brighter ones more conspicuous on the prothorax and patagia than elsewhere; beneath covered with pale yellowish hairs, mingled with dusky ones. Femora pale yellow, whitish above, the inside of the middle and hind pair dusky; tibiæ and tarsi dull orange, becoming dusky above, especially at the tips of the tarsal joints and increasingly so toward the tips of the legs; spurs pale orange, tipped minutely with testaceous; spines testaceous; spurs reddish; pad dusky.

Wings above tawny, exceedingly broadly bordered with dark brown, particularly in the female, where the tawny is reduced to a comparatively narrow interrupted band. Fore wings with the outer margin broadly bordered with dark brown, the interior margin of the border passing from the tip of the costal nervure on the costal margin in a bent, slightly curved, pretty regular line to the middle of the outer two-thirds of the submedian nervure, and passing midway between the apex of the cell and the outer margin of the wing; the inner margin is similarly bordered with dark brown as far as the submedian nervure; the costal edge is blackish, and within these encompassing borders the veins are distinctly marked with dark brown; besides which the outer limit of the cell and the outer half or two-thirds of the upper limit are rather broadly bordered externally with blackish, which often reaches to the costal border; besides, the basal third of the wing, and especially the part lying below the middle of the cell, is heavily begrimed with brownish scales, most conspicuously next the nervures; and all these latter markings are so blended in the female that no tawny color whatever is left but a small quadrate spot (often obsolete) at the tip of the cell, and a transverse, nearly equal, strongly curving or bent band next the outer bordering, about as broad as the width of the cell; this is indeed most frequently reduced to a series of 7 or 8 unequal longitudinal spots, forming a bent series lying farther removed from the outer margin, the upper portion starting from the middle of the outer half of the costal margin and directed toward a

point scarcely below the middle of the outer margin; the other part of it is directed at right angles to the upper portion. Fringe dull brown, sometimes tinged with tawny, paling externally.

Hind wings so broadly bordered as best to be described as dark brown, with the central parts tawny; in the male consisting of a roundish patch cut by the nervures delicately traced in brown, extending nearest to the outer border (a little more than an interspace distance from it) on the lower subcostal nervure, and occupying the space between this and the tip of the cell, and reaching from the lowest median nervure to the middle of the subcostal interspace; within the cell is an obscure tawny patch, and the medio-submedian interspace is obscured by some tawny hairs. In the female the fulvous colors are reduced to a series of longitudinal streaks, separated by broadly marked nervures, occupying the same place as the large patch of the male, but reduced in breadth. Fringe pale dull fulvous, the basal half brownish.

Beneath the markings are much the same, though scarcely so intense as above, and on the hind wings of the male very much obscured; the tawny on both wings has become a dull lemon yellow, sometimes in the female rather pale, and the brown, excepting in the lower half of the fore wings, where it has turned to blackish fuliginous, has become obscure tawny brown, in the female tinged with fuliginous; in the brighter portions the nervures are rather narrowly marked with tawny or brownish tawny, in the darker parts very faintly with yellowish or brownish yellow; the tip of the cell in the fore wings of the male, and sometimes in those of the female, is marked with an oblique blackish streak, and at the tip of the cell of the hind wings of the male is a small obscure blackish spot next the nervure at either side. Fringe dusky, tipped with pale, more broadly below than above.

Abdominal appendages of *Atrytone Kumskaka*, male, viewed laterally; the lower partial figure shows the clasp as seen from beneath.

Abdomen black, the sides, especially on apical half, largely tinged with fulvous; beneath pale yellowish, becoming tinged slightly with greenish toward the tip. The appendages of the male are shown on a side view in the accompanying sketch. The upper organ is very strongly arched,

almost bent in the middle, beyond which the heaviest part is found; this is not large but gibbous, transversely convex, and directed downward, the hooks straight, with a scarcely perceptible separation, together continuing the taper of the centrum, stout and very blunt and heavy at tip, where it is scarcely arched; lateral arms stout, curving upward and inward at tip, meeting just beyond the tip of the hooks. Clasps about half as long again as broad; the upper process broad and short, squarely docked, scarcely turned upward, but directed backward, a little incurved, the lower angle sharp, but the upper rounded; above this the posterior margin of the clasp retreats a little, and bears in the middle a broad and short truncate tooth, overhung by the upper process, the base of which is curved over so as to be horizontal, is similar to the lower process, but bears at its lower extremity a long, equal, slightly depressed, incurving finger, nearly half as long as the breadth of the clasp, its bluntly pointed tip touching the extremity of the upper organ.

Length of fore-wing, male 15.75–16.25 m.m., female 17.–17.5 m.m.; of antennæ, male 7.75–8.4 m.m., female 7.8–8.1 m.m.; of hind tibiæ and tarsi, male and female 7.75–8 m.m.; of fore tibiæ and tarsi, male 4.9–5.15 m.m., female 5.25–5.3 m.m.

Described from two males and three females from the Western States.

PREPARATORY STAGES OF APATELA FELINA, Grote.

BY G. H. FRENCH, CARBONDALE, ILL.

Young Larva.—Length .10 inch; body cylindrical; head broader than the body, oblique. Color of the upper part and sides of joints 2, 4, 5, 7, 8, 9, 12 and 13, reddish purple; the rest of the upper part and sides and the venter dull whitish; six rows of tubercles from which proceed small clusters of brown hairs, the four rows of dorsal clusters longer than the body; head black; feet purplish. Duration of this period, 4 days.

After First Moult:—Length .22 inch; shape about as before. The joints that were reddish purple during first stage are now black, the others white, the tubercles small, black; head black; hairs from the dorsal tubercles dark gray, the others white. Duration of this period, 3 days.

After Second Moult:—Length .35 inch. Color of the upper part

black and creamy white ; under part grayish brown, with two pretty well defined streaks of this color on the white part of the sides. The colors above are as follows : Joints 2 to 5 black, 6 white, 7 to 10 black, 11 white, 12 black, and the terminus of 13 black ; a fine dorsal line of clear white ; the tubercles the same as before, each bearing a cluster of hairs of various lengths, the longest nearly as long as the body ; the two dorsal tufts on joints 5, 7 and 12 with small pencils of short black hairs ; a few black hairs from the tubercles on the other black joints ; the hairs from the tubercles of the white joints clear white, with a few brown hairs intermingled in the dorsal pencils ; head and feet black. Duration of this period, 4 days.

After Third Moult :—Length .60 inch. On the dorsum are three stripes, a broad gray one in the middle, in the centre of which is a fine white line, and each side of this stripe a whitish stripe ; below this most of the side is pale yellow ; the whole strongly tinged with green. The tubercles bear thick clusters of short spreading hairs ; the dorsals on joints 5, 7, 8 and 12 black, with a few black ones in some of the others, but most of the rest of dorsal hairs white ; those from the white stripe, white ; those from the yellow stripe, yellow and mostly longer than the others ; a long fringe each side of the body, extending round the posterior extremity. Head and thoracic feet black. Duration of this period, 6 days.

After Fourth Moult :—Length 1 inch when at rest. Color of body yellowish green, with a gray dorsal stripe ; under parts grayish brown ; the whole body covered with fine yellow hairs that spring from the general surface as well as from the tubercles ; the tubercles or piliferous spots scarcely distinguishable from the general surface save that from these the hairs are more in clusters ; a few black hairs in place of the former black pencils. Head black, the front with the usual pale inverted Y ; the sides mottled with black and pale brown. Duration of this period from 4 to 5 days.

Mature Larva :—Length when crawling 1.60 inches ; when at rest 1.40 inches. Characters the same as at the beginning of the period.

Chrysalis :—Length .80 inch ; to end of wing cases .40, these extending almost to the posterior part of joint 5 ; depth from .21 to .22 inch ; cylindrical, tapering gradually from joint 5 back, the tongue case extending only to the anterior part of joint 5 ; the anterior part of abdominal

joints finely punctured; head rounded; wing cases slightly wrinkled. Color, mahogany brown, the wing cases and other anterior parts darker. Cremaster a series of short hooks extending out laterally, fastened into the lining of the thin cocoon. Duration of this period from 269 to 275 days.

The eggs from which the larvae upon which the above observations were made were received from Mr. C. F. McGlashan, of Truckee, California. They were deposited July 6th, 1885, reaching me the 12th, just as the young larvae emerged from them. This gives the egg period 6 days. This would give us a total from the egg to the moth of 296 days. This would give ample time for a second brood, as from the egg to pupation only consumed 27 days of the 296, and add to that 14 days, the usual pupal period of a great many of our moths. But it is quite probable that in its home in the Sierras these periods would be considerably lengthened out, so that the moth would not emerge from the chrysalids till some time in June, instead of from the 2nd to the 6th of May, as these did, as it is generally known that heat accelerates the growth of insects, and that cold retards the same. In the case of *Leptarctia Lena*, I find an exception to this general law, however.

The food plant of this insect is willow. In pupating, the larva fastened its cocoon closely against the side of the box (made of soft pine), some of the fibre of the unplaned board being woven into the outer part of the cocoon. The cocoon was thin, firm and tough.

NOTES ON SPECIES OF LEPIDOPTERA.

BY AUG. R. GROTE, A. M., BREMEN, GERMANY.

A. Observations on the Larvæ of certain Bombyces.

1. *Dryopteris rosea* Walk.

The full grown larvæ, in the beginning of July, feeding on *Viburnum acerifolium*, the "Maple-leafed Arrow-wood," * are, in their last stage, olivaceous brown, pale dorsally; dorsal line single, dark; a triangular

* The plant was determined for me by Mr. A. Pettingill, to whom I am indebted for more specimens.

dark patch on each side of the body commencing on segment 4 (I do not count the head) and bordered above the abdominal feet with pinkish ; anal segment prolonged. Similar anal prolongations occur in the larvæ of other genera of this sub-family, and a resemblance to *Cerura*, where it is furcate, throws light on the relationship of these moths. In resting, the terminal segment is slightly elevated. A fleshy protuberance on the dorsal line on third segment. Pupation in a light, close web of pale brown silk, between the leaves (July 6–8). Coloration protectional, concealing the larva as it rests on the stem of the leaf. The spotting of the "tail" with pale is part of the protective coloration. After three weeks in the pupa the moth appears. Now that the whole history of *Dryopteris* is known, it is seen that in the structure of the larva and its habit it closely agrees with the other genera of the sub-family. It is probably double-brooded, the pupae of the second brood hibernating. An ally of this genus is described by Walker from Japan ; whether the genera are distinct I cannot say. Walker does not even compare them, calling our moth a *Drepana*, while Herrich-Schaeffer calls it a *Cilix*. We have two species of *Dryopteris ;* the larva of the second, *irrorata* Pack., is unknown to me.

In the few descriptions of larvae which I have drawn up, I commence the numerical series with the first prothoracic segment ; it seems to me quite wrong to commence with the head, which must be described separately. Thorax 1–3; abdomen 4–12.

2. *Anisota stigma* Fab.

The larvæ on oak in July are in their last stage, light leather brown, a sub-dorsal row of stout black spinules, an infra-stigmal series all commencing on segment 2, which is provided with a pair of long black spines curved backwards ; the skin is dotted over with white, especially on the segments anteriorly and beneath ; a dorsal series of spinules, of which the one on 12 is stoutest ; two on anal segment. There is a fore and aft symmetry in the disposition of these spinules, which must be looked upon as defensive in their nature. This caterpillar differs generically from that of *Sphingicampa bicolor* and *S. bisecta*. There is no doubt that we have two genera, but whether this last genus should not be called *Adelocephala* of Boisd., I cannot decide without South American types to compare. Enters the ground to pupate ; a resemblance can be shown between all these larvæ, *Citheronia*, *Eacles*, *Anisota*, a progressive development of the

spinules into fleshy horns; by the development of the twelfth segment and its spine, an approach to the *Sphingidæ* is signalized, which the form of the moth somewhat confirms no less than the mode of pupation. I do not regard the *Sphingidæ* as related either to *Cossus* or *Hepialus*, but to the Ceratocampians (*Saturniadæ* in part) and *Notodontinæ*. As we shall see further on, there is a succession of development of the spines from *Dryocampa*, where they are merely present anteriorly and posteriorily and the body is naked, to *Citheronia*, where they are fleshy, long, exaggerated and complicated. I have not at this writing all the necessary material before me, but I have been interested in describing and figuring the simplest forms in this group of larvæ, and in showing that there is so great a difference and development of larval armature within this one group that we may use it as a guide in arranging the genera, of which *Eacles* would seem to be the highest in the series.

3. *Anisota virginiensis* Drury.

Already, as in the moth, the larva shows an approach to *Dryocampa* by the lessening of the armature. Taken on oak at the same time, this larva has the infra-stigmatal line of spinules weaker, as also the sub-dorsal series which rest on the reddish sub-dorsal stripe. The anal spinule of the dorsal series is shorter than in *A. stigma*, and this is true of the weaker thoracic horns, which are more bent and arise with a greater slope forwards. The color is obscure greenish, mottled with black; an infra-stigmatal reddish stripe. Stigmata distinct, much as in *D. stigma*. The anal segment has but one small spinule. Enters the ground to pupate.

4. *Dryocampa rubicunda* Fabr.

Larva light green, with longitudinal stripes of a darker shade. The spinules have disappeared and this is evidently the lowest form in the group, the larva commencing to look like that of some of the lower moths. The black horns on segment 2 are retained, as also dorsal spinules on 11 and 12; a pink stripe laterally, the head is discolorous; the stigmata concolorous and concealed, not prominent and discolorous as in *Anisota*. But the narrower larva is otherwise quite similar. Enters the ground to pupate. On oak, maple, and a number of trees. I regret not to know the larva of var. *alba* Grote, which would be interesting to compare. As the variety is common, it will doubtless soon be described. Hübner, with an eye for the general appearance and structure of moths, calls this group

communiformes; I fancy he meant by this that the moths approached the *Noctuidæ* in their proportions, that the body was heavy and longer than the wings. I may be wrong in this. The moths are interesting to me, as I have long ago said, from the curious way in which the pattern of the upper surface of hind wings is reproduced on primaries beneath; this is also the case in the *Noctuidæ*. I have said it is as if the pattern of one were photographed on the other; we have an approach to this in the *Smerinthinæ*, in which the under side of fore wings is often rosy. This is seen more or less in all moths in which the wings cover each other in a state of rest; therefore not in the *Geometridæ*, not in the Butterflies. The *Ceratocampinæ*, which Grote and Robinson, in correction of Packard, separate from the Saturnian genera *Hemileuca*, etc., are an American subfamily of *Bombyces*, probably the descendants of an old type more intimately connected with the Hawk Moths. The eye spots of *Smerinthus* are re-called, the rosy disc of the secondaries is here repeated. The group is probably South American in its origin. It has a feeble but beautiful representation in North America.

B. Description of an Unknown Larva belonging to the Geometridæ.

A small colony of nearly full grown larvæ were observed on *Syringa vulgaris*, the common lilac, on September 16th, on Staten Island. The total length extended was then 30 mil. The head was small, the thoracic segments narrowing anteriorly. The two jointed antennæ were provided with a bristle at the extremity of the second joint. Two pair of abdominal or false feet. From the 4th to the 7th segment the body was enlarged and somewhat flattened, the segments provided with a rounded lateral prominence and with a dorsal transverse ridge showing small yellowish points on each side, from the inner edge of which points sprang a single hair. The latter characters were shared by all the abdominal segments. The 7th to the 9th segments showed a pale yellowish lateral patch, below which the ventral protuberance was flecked with the same color extending along the abdominal legs on the latter segment. A more elevated dorsal hump on the anal segment, consisting of two protuberances; from the apex of each is emitted a single short bristle. This seems to recall a stage in the development of the caudal horn of the *Sphingidæ*. The whole body seems naked, but two isolated hairs or bristles are seen to arise subdorsally along the segments. The head is sparsely hirsute. The general color of this singular larva is dark wood brown, marbled dorsally with a

paler shade. The whole larva looks like a withered leaf. When discovered the little colony were hanging head downwards, supported by the two abdominal feet, and giving themselves a slight swaying motion with the free portion of the body (not unlike that we see in some pendulous pupæ), the resemblance to a dead, half-fastened leaf, preparing to fall with each stronger gust of the autumn wind, was heightened. My attempts to rear the colony were frustrated by their escape, and before a drawing could be made, which I intended. Belonging probably to the *Ennomidæ*, these larvae were remarkable for their mimicry of dead leaves. The larvæ of the *Geometridæ* are often very interesting from their bizarre forms and singular ornamentation, which, of all the groups of moths known to me, most nearly resembles that of the curious forms among the higher Butterflies.

C. Two Gray Species of Lithophane.

For the synonymy of this genus see *Grote*, Check List, p. 38, 1876. It is called incorrectly *Xylina*, whereas *Xylena*, Hübner, has for type *Hadena lithoxylea*. These little *Noctuidæ* hibernate in the moth state, inhabiting the north temperate regions. We have a number of species, among which are two purely light gray forms, *L. fagina* Morr., and *L. Georgii* Grote, besides the darker gray and stouter series of *L. antennata* Walk., *L. laticinerea* Grote, and *L. Grotei* Riley (=*cinerosa* Gr., n. b. l.), and which series is considered varietal by Professor Riley, and one of distinct but nearly related species by myself, I first separating and describing them.

Lithophane fagina Morr.

This species differs by the obsolescence of its markings, which gives the primaries a somewhat narrower appearance, and recalls those of *Cucullia*. A white shade, more purely white and more extended than in any other species of the genus, extends along costa to apical third. The customary markings are lost or barely indicated by hair streaks of black scales. The veins are marked finely in black. The series of cuneiform marks forming the subterminal line can be faintly made out on the shining gray concolorous wings; the stigmata are lost; hind wings pale smoky gray with whitish fringes, reflecting the irregular smoky mesial band and thick discal mark from the under surface, which is paler than

above. On the darker fore wings beneath the spot and band are more faintly repeated. Head and thorax concolorous dark smoky gray, paler beneath; abdomen like secondaries. Not rare. Canada to Middle States. Larva unknown. Hibernated specimens are found in April and May; the fresh examples may be taken in October.

Lithophane Georgii Grote.

Differs by its warmer and darker gray color; the pale costal shading of primaries is confined to the shoulder of the wing; the black angulated median shade is diffuse and evident; the veins more evidently black marked; the subterminal line is distinct, and the customary black basal ray is to be plainly seen. Beneath the mesial smoky band on the whitish gray secondaries is wavy, being roundedly indented on the disc, and this character is very evident on comparison, its course being straight without prominent inflection in *L. fagina*. Mrs. Fernald sends me this species from Maine; the type was collected by Mr. George Norman, in Canada.

D. On Parorgyia Clintonii.

This northern form is allied to the southern *leucophaea* of Abbot & Smith, but one or two specimens from Georgia and Alabama were evidently different, or suggested a rather wide variation. The *achatina* of Harris and Packard is not Abbot & Smith's species, but is based on specimens belonging to *Clintonii*. The moth described by Dr. Packard as *Platycerura furcilla*, is apparently related to this group, resembling the European *Dasychira pudibunda*, but of a more compact, noctuid-like form. Its name is a misnomer, as it is in no wise like *Cerura*, where it is placed by my old friend Dr. Packard, in whose monograph, admirable for its arrangement of the groups, the genèra with furcate anal extension in the naked larva are brought near the group where the anal extension is undivided, evidently correctly. The larva of *Platycerura* is, however, hairy, as described by Lintner and Thaxter, and resembles the larvæ of the *Apatelinæ*, where I have placed the genus, I think correctly. None of the European genera examined by me appear identical with *Parorgyia*, which genus seems an extension of *Orgyia*, in which the female is winged and the whole form in both sexes stouter.

NOTES ON THE LOCUSTIDÆ, WITH DESCRIPTION OF A NEW SPECIES.

BY WM. T. DAVIS, STATEN ISLAND, N. Y.

Whether they fill the listener with a train of happy thoughts, as Gilbert White says, or whether they produce a sadness because the days of summer are nearly gone, as Dr. Harris asserts, the songs of crickets and other Orthoptera have, nevertheless, the merit of always being interesting. An insect that can sing—that has something to say—even though it be the same, night after night, enjoys a sort of individuality, and this long discussion of the Katydids and the quiet murmur of the tree crickets, constitute one of the chief charms of our summer evenings. But they do not always sing or stridulate quite alike, and sometimes, too, their shrilling apparatus is slightly deformed or injured, producing some curious sounds when in use.

I once heard a Katydid whose singing apparatus was out of order, and the sounds given forth contrasted strangely with those of a rival male in an adjoining tree. *Amblycorypha retinervis* produces two somewhat different songs, or perhaps more correctly, varies the same song in time or extent of utterance, so that unless the same individual is listened to for some time, the notes might be attributed to different species. This insect often lays its eggs on the honeysuckle, and I once observed a female on the 16th of Sept., ovipositing on a low tree by the road side, gradually biting the bark into a ridge, along which the eggs were laid, tile fashion.

On Staten Island, the first Conocephalus that is heard in the garden is *ensiger*, and with *ik-ik-ik*, as if sharpening a saw, enlivens low bushes and particularly the corn patch. This insect seems to especially delight in perching near the top of a corn-stalk and there giving forth its rather impulsive song. I have often watched one crawl, with many a spiral turn, up the stem, fiddling all the while. My notes on its first heard stridulation show considerable uniformity, and the average date may be taken as July 15th.

Conocephalus dissimilis is more of a low grass and weed loving insect than *C. ensiger*, and also comes later in the season. I have found this insect stridulating when its head was gone, picked off perhaps by some

vagrant chick. The brown colored specimens are much more common in this species than in *ensiger*.

Conocephalus robustus resides for the most part mid the grass on sandy ground near the sea shore, though an occasional individual finds its way inland. Along the sea beach they stridulate in early afternoon, especially if slightly cloudy, and when approached they have a curious fashion of dropping to the ground. I have often found them, on such occasions, actually standing on their heads in the soft sand, leaning against the grass stems which grow so close together, without in any way holding on to them. Whether this position is intentional or not, I cannot say, but certain it is that when looked for from above they offer the smallest extent of their bodies to view and may thus escape many enemies.

I have found another Conocephalus on Staten Island, mid the cat-tails that grow on the salt meadows, and a specimen sent to Mr. Samuel H. Scudder was considered by that gentleman to be an undescribed species. This insect keeps very close to the ground, hiding well in the vegetation, and is not easily discovered. The sound produced when stridulating is very faint, not louder than that made by *Gryllus abbrinatus*, and I was much surprised to hear such a faint song come from so large an insect. I have, in consequence of this faint song, named it the "slightly musical" Conocephalus.

C. exiliscanorus. A large species, brown or green, the tegmina in the brown specimens irregularly dotted with fuscous spots. Fastigium long, moderately pointed, bent downward at apex, slightly flattened and scabrous above with medial groove or depression, depending tooth at lower base of fastigium pointed. Pronotum scabrous. Tegmina moderately broad and slightly falcate. Hind femora with numerous spines beneath, the other femora with only an occasional abortive spine near tip.

Length of body (including head), 37 m.m.; of fastigium beyond front edge of eyes, 5 m.m.; of pronotal disk, 9 m.m.; of tegmina, 40 m.m.; of hind tibiae, 21 m.m.; 2 ♂.

This insect is allied to *C. ensiger*, but readily distinguished by the longer fastigium, the entire under surface of which, with the exception of the basal fourth, is of a deep shining black.

DISSOSTEIRA CAROLINA.

BY JEROME M'NEILL, MOLINE, ILL.

During the past summer I collected at Dublin, Wayne Co., Ind., a number of *Œdipodini* that seem to be a long-winged variety of the above named species. A comparison of the dimensions given by Thomas and Saussure for *D. carolina* and *D. longipennis* with measurements taken from eleven of these specimens, will show what the difference amounts to. The former, in his Acrididæ of North America, page 118, gives for *D. carolina* the following dimensions: "Female—Length, 1.5 to 1.75 inches; elytra, length of the body; posterior femora, about half the length of the body. Male—Length, 1 to 1.25 inches; elytra and wings passing the abdomen about one-third their length." The same authority gives for *D. longipennis:* "Length, 1.14 inches; elytra, 1.27 inches; posterior femora, 0.64 inch; posterior tibiæ, 0.55 inch." These dimensions are those of the male, the female being unknown to Thomas.

Saussure, in his "Prodromus Œdipodiorum," pages 137 and 138, gives for the measurements of the first named species: "Length, female, 40, male, 33; elytra, female, 41, male, 36 mill." And for the last mentioned species: "Length, female, 45, male, 35; elytra, female, 46, male, 35 mill."

It appears from these facts then that while the length of the body is greater in *D. longipennis*, the wings are proportionally longer in both female and male of *D. carolina*, and absolutely longer in the male of this species, so that the latter is, in spite of the name, the long-winged species. But the Dublin specimens exhibit a much greater contrast in the relative lengths of the elytra and bodies, as a glance at the following table will show:—

No. 1,	female,	length,	34	;	elytra,	41	;	posterior	femora,	17	;	posterior	tibiæ,	14 mill.
No. 2,	"	"	37	;	"	40	;	"	"	17	;	"	"	15 "
Average	"	"	35.5	;	"	40.5	;	"	"	17	;	"	"	14.5 "
No. 3,	male,	length,	27	;	elytra,	33	;	posterior	femora,	14	;	posterior	tibiæ,	12 mill.
No. 4,	"	"	28	;	"	34	;	"	"	15	;	"	"	12 "
No. 5,	"	"	27	;	"	33	;	"	"	14	;	"	"	12 "
No. 6,	"	"	27	;	"	32	;	"	"	15	;	"	"	12 "
No. 7,	"	"	30	;	"	34	;	"	"	14	;	"	"	12 "
No. 8,	"	"	27	;	"	33	;	"	"	14	;	"	"	12 "
No. 9,	"	"	28	;	"	35	;	"	"	15	;	"	"	13 "
No. 10,	"	"	26	;	"	33	;	"	"	14	;	"	"	12 "
No. 11,	"	"	29	;	"	34	;	"	"	14	;	"	"	12 "
Average	"	"	$27\frac{2}{3}$	;	"	$33\frac{4}{9}$	;	"	"	$14\frac{1}{3}$	;	"	"	$12\frac{1}{9}$ "

In the female then the elytra are 1.14 the length of the body, while in the male the elytra are nearly 1.21 the length of the body.

To present this striking difference to the eye then: In the Dublin specimens the ratio of the elytra to the body is, female 1.14, male 1.21; according to Saussure, female 1.02½, male 1.09; according to Thomas, about 1.

These specimens have in several cases the black portion of the wings more or less distinctly fenestrated. This marking is particularly distinct in one specimen on the basal third of the wings. They all have two pale bands on the inside of the femora. The elytra extend beyond the body from .32 to .44 of their length.

NOTE ON THE SAW FLY, HYLOTOMA DULCIARIA, Say.

BY THE REV. T. W. FYLES, SOUTH QUEBEC.

On page 38 of the February number of last year's ENTOMOLOGIST, is a note, written by myself, concerning an injurious Saw-fly larva which had appeared in abundance in the neighborhood of Quebec. I preserved quite a number of the cocoons of the species, hoping to obtain the perfect insect from them. Some of the cocoons were kept in a box in my study, others in a tin case placed in the cellar, and yet others in a glass jar half filled with moist earth. It was from the last lot only that I met with a successful result. In July last two imagos presented themselves. The insect in its perfect state is of sluggish habits. Its head and wings are purple; its thorax and abdomen yellow. It is about one inch in expanse of wings. Knowing that Mr. Harrington had given much attention to the Hymenoptera, I brought the insect under his notice, and he was able to identify it as *Hylotoma dulciaria*. The description of the insect given by Norton is as follows:—

H. DULCIARIA.

Hylotoma dulciaria, Say. Long's Second Exp. II., 1824, 314, ♀. "Pale rufous; head, wings and feet violaceous black." Length 0.34–0.48. Br. wings 0.74–1.04 inch.

♀. Antennæ black, with a violaceous tinge; nasus emarginate, short; head, a spot on pectus and ovipositor sheaths blue-black, remainder of body testaceous or yellowish-red; legs steel-blue; spines same color;

inner spines rather blunt; wings violaceous, sub-hyaline, less obscure at apex, a large darker spot below stigma covering marginal and the upper half of all the submarginal cells; under wings with but one middle cell.

Maine, N. Hampshire, Connecticut, New York, N. W. Ter. (Say), Illinois, English River (Smithsonian Institution).

This is probably the same with *H. pectoralis*, Leach, from which it differs only in the color of the wings and the black ovipositor sheaths, which Say calls the "tail black."

Cat. of the Tenthredinidæ and Uroceridæ of N. Am., by Edward Norton, from Trans. of Am. Ent. Soc. 1867-9, page 40.

It was not till the first week in August that the insect appeared in its natural haunts. At that time I found, along the St. Louis Road, great numbers of the flies which had been trodden under foot by the passers by. These flies were somewhat larger than those I had succeeded in raising; but there could be no doubt as to the identity of species. This autumn the larvæ have been again abundant, but not more so, as far as I can judge, than they were last year.

THE COCCIDÆ IN THE MUSEUM OF COMPARATIVE ZOOLOGY, CAMBRIDGE, MASS.

BY DR. H. A. HAGEN.

Having newly arranged the Coccidæ of our collection, which have been named by Prof. J. H. Comstock, I compared them with the Professor's Catalogue for 1883, and ascertained the presence of two-thirds of the 168 numbers enumerated. I find that only 27 N. Amer. species are wanting. Among the insects received in the collection of the Peabody Academy is *Lecanium tiliæ*, A. Fitch, from Mt. Carroll, Ill., by Mr. Shimer, very probably identical with A. Fitch's species, and *Lecanium tulipiferæ*, Cook, by typical specimens. A certain number is not yet determined, also the later accessions have not been put in the collection. There are some European types of importance. Two of Prof. Ratzeburg's are not published; *C. variolosus* is believed by Prof. Comstock to be the No. 122, *A quercicola*, Bouché; the other is *C. conchatus*, both from the European oak. I am always eager to make the collection of this family more complete. Perhaps it is not out of place to say that the Phytoptocecidia in the collection has been enlarged by European and American species.

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THE LARVA OF LIPHYRA BRASSOLIS PROBABLY APHIDIVOROUS.

BY REV. W. J. HOLLAND, M. A., PH. D., PITTSBURGH, PA.

Some two years ago I received from Rev. L. C. Biggs, H. B. M. Chaplain at Penang, a parcel of insects collected by Mr. F. G. Durnford in Sungei-Ujong. Among them was a specimen the envelope containing which was labelled *Charaxes Durnfordi*, n. sp. Mr. Biggs, in sending the lot, called attention to this particular specimen in his note, saying: "It looks as if it were covered with mildew, which Durnford assures me is really fluff detached at the time of its capture." I did not examine the specimen very particularly at the time of its receipt, except to note that it was covered with a whitish mealy deposit, particularly thick upon the abdomen, and that it was not a *Charaxes*. Some three months or more ago I undertook the task of expanding this lot of insects and arranging them for my cabinets. I found, as I was putting the envelopes into the pans to relax them, several which contained specimens of a large "mealy bug." These were laid aside. At last I came to the alleged "*Charaxes Durnfordi*." What was my delight to find it to be a fine large female of *Liphyra brassolis*, Westwood. I had just received from Mr. W. H. Edwards a copy of his most interesting paper upon the habits of the larva of our *Feniseca Tarquinius*, an insect revealing very close relationship to the gigantic *Liphyra*, alike in the form of its wings, their neuration and their color. The true explanation of the "fluff" or mealy deposit upon the abdomen and lower side of the wings of the specimen instantly flashed upon my mind. I hastily looked up the envelopes containing the scale insects or "mealy bugs." A comparison beneath the microscope of the white particles clinging to the abdomen and lodged upon the wings of the *Liphyra*, with the mealy covering of the shield lice preserved in the envelopes, revealed their identity. I mentally put the two things together and conclude:

a. That Mr. Durnford captured this specimen of *Liphyra* near a colony of scale insects, which was so large as to attract his attention and lead him to put a few of them into papers.

b. That this female was engaged in oviposition just before she was captured by Mr. Durnford, and that the mealy white deposit which Durnford spoke of as "fluff," which Mr. Biggs compared to mould or mildew, is nothing else than fragments of the white covering of the scale insects, over and among which the butterfly had been flying while engaged in the act of laying her eggs.

If my conclusion is correct, and it seems to me that there can be no question of its correctness, we have a second species to add to the list of those Lepidoptera, the larvæ of which are carnivorous, or aphidivorous, or coccivorous, as the reader pleases.

Light is also thrown by this discovery upon the generic relationship of *Feniseca* and *Liphyra*. The two are brought together into the same group. The classification of the Lycaenidæ of the world is as yet not fixed upon a final basis, but we are gradually reaching just conclusions. For my part, I would fail to agree with the assertion of my good friend, Mr. Edwards, to the effect that *Feniseca* is to be referred to the Erycinidæ. The formation of the legs, the neuration, the shape of the antennæ and of the chrysalis, is such as to convince me that no mistake has been made in putting this genus among the Lycaenidæ. The fact that the larva presents points of difference from the larva of such a species as *L. Pseudargiolus*, or *Chrysophanus Americana*, should not weigh as against these other points in fixing the generic relationship.

NATURAL HISTORY NOTES ON COLEOPTERA—No. 3.

BY JOHN HAMILTON, M. D., ALLEGHENY, PA.

Cicindela punctulata Fab. The Cicindelas are generally regarded as diurnal, many of them appearing only during the hottest sunshine and disappearing if there comes but a cloud. In one respect *punctulata* is an exception, for while it flies by day like the others, it is occasionally (if not habitually) a night-flier. Several times late in summer it has been taken on my table at night, attracted by the light, and last autumn in a house in

the outskirts of the city I took in this way a couple, and was told that what was considered the same insect was a frequent visitor. This habit I think is not unknown.

Anisodactylus (Xestonotus) lugubris Dej. is frequently confounded with *A. Harrisii*, both species being often found together, and their size and general appearance the same. *Harrisii*, however, has two setigerous punctures at each side of the epistoma, while *lugubris* has but one; so that if this is remembered, a glance will separate them. There is a short description of this species in the Trans. Am. Phil. Soc., N. S., Vol. x., p. 343; and recently the female has been well described by Lieut. T. L. Casey, Contributions, etc., part 1, p. 9. under the name of *Harpalus Manhattanis.*

Pinophilus. The described species of this genus are five in number. One of these *(densus)* is Californian; the others belong to the South Atlantic and Gulf, with extensions into the Middle States. *P. latipes* occurs here sparingly, but is not recorded further north; it is variable as to its habitats; I have taken it in damp alluvial places under drift, under stones on dry hills, and under the damp bark on fallen timber. Mr. A. C. Reisig, of New Orleans, La., who finds this species, as well as *picipes*, *parcus* and *opacus*, abundantly, states that they occur mostly in wet places around a small species of Palmetto, between the sheathing leaves of which they often crawl when the weather is cold, and are taken less often under the loose bark of trees, which he thinks is too dry for them. Mr. T. L. Casey took two of the species "in damp earth under decomposing vegetable matter, and in a few instances under stones;" two other of the species were "attracted at night to electric lights at El Paso, Texas." (Cal. Acad. Sci., Bul. 6, p. 262.) From the above it will be seen its habitats are various and are probably all used merely for shelter; and this does not materially conflict with the statement in the Classification, p. 99, that the species are "found under bark of trees." That, and similar statements elsewhere, are to be taken only in the widest sense and are correct enough for all practical purposes. It does not live in the ejectamenta of animals, nor in putrid animal matter. The specimens of *P. latipes* found by me under bark seemingly fed on an abundant liquid of decomposition found there, and such substances, with small larvæ, crustaceans, etc., probably constitute their food.

Amphicrossus ciliatus Oliv., *Europs pallipennis* Lec., *Bactridium cavicolle* Horn. The first of these was taken plentifully and the others

sparingly in April and May at sap on the stumps of black walnut, under chips. Black walnut cut from January to April produces on northern exposures a flow of sap until June, and by the judicious placing of chips, all the insects that delight in putridity may be taken, and their number is great. If the surface of the stump be hacked unevenly, the minute species will be found in the cracks of the undetached chips. Birch cut in the same way might do as well, as it flows sap abundantly and for a long time.

Pallodes (silaceus) pallidus Beauv., so abundant in many species of mushrooms, is here entirely pallid, some specimens having the elytra a little infuscate at the sides. As it occurs in Florida it appears so different as not to be readily recognizable by those acquainted only with the pale form. The head is pale; the thorax has the disk dark piceous, becoming paler to the margin; the elytra vary from dark piceous to castaneous, the whole upper side being highly polished and iridescent. From Dr. Horn's description of this species in his monograph of the family, one is scarcely prepared for such extremes in colour variation, as this is not greatly emphasized.

Betarmon bigeminatus Rand. Collectors desiring this pretty little species can beat it sparingly from spruce growing in open places, from June till August.

Cleotus aphodioides Ill., is found in early spring (till May) under the bark of dead standing trees not yet separated from the wood—notably oak; last April (25th) I took more than one hundred individuals from one small tree, from two to eight being packed in one cavity and many of them in copula, as the day was warm; these beetles were not bred in the place where found, but came there to hibernate. They enter the tree through a hole in the bark that has served the previous summer for the exit of some wood-bred beetle—in the present instance *Urographis fasciatus;* they scoop out when necessary some of the borings of the original inhabitant between the wood and the bark, and in this excavation pack themselves closely, leaving the hole by which they entered open. Where their larval life is spent is unknown, but it would appear to be under ground, as many—nearly all—of the beetles had the deep submarginal groove of the elytra filled with white dried mud, giving them the appearance of being surrounded by a pale cincture. Of the other species *(C. globosus)* I have found but a single individual; the principal differences between the two seem to be that in the latter the punctures of the striae are not so close and the margin of the elytra serrate. Should it be found in numbers these

differences might be overcome, as some of the individuals of *aphodioides* have the margin semi-serrate, and the punctures of the striæ nearly as far apart, and a corresponding approximation of the other species in the other line would about cause them to meet.

Nicagus obscurus Lec. The position of the genus of which this species is the only known representative has been a matter of no little discussion by systematists; to some it is a Lucanide, while others—among them the authors of the Classification, find the Scarabaeidan characters to preponderate. See Jour. Acad. Nat. Sci. Phil., 2 s., v. 1, p. 86; and Classification, p. 245.

April 23rd of last year, I took 63 specimens, five only of which were females; these with one exception differed greatly from the other sex in size and appearance, being much larger, more convex, less hairy and with the elytra evidently striate, resembling some *Sericea*. The exception, however, differed chiefly from the males by its shorter tarsi and stouter tibiae. In death the joints of the antennal club are mostly open, but in life they seemed capable of being closed contiguously, though the want of a lens prevented me from verifying this absolutely.

They were all taken on the margin of a creek on a deep deposit of loose, white sand, left on the recedence of the spring flood. The day was very warm, and they were first noticed about 3 p.m. coming seemingly from an adjoining pasture ground, and disappearing suddenly in about an hour on the sun clouding over. They flew very slowly, circling around close to the sand as if in search of something, and alighting in tracks and indentations, they were easily picked up. Just why they resort to sand deposits is not understood; it may be for sexual purposes, but if so they cannot live there in the larval state, because these sand beds are swept away by every overflow; it may be for warmth (as in the case of *Catalpa lanigera*, several specimens of which I took there that evidently came for the heat), but others have observed them doing the same thing in the heat of midsummer; or it may be in search of decomposing shell fish, but there were none there, and in fact it is not proven that the larvæ live on decaying animal substances, though once found near dead *Unios*, and in the light of other facts I would say such is improbable, were it not that long ago I adopted the motto "*Festina lente*," in deciding adversely to the opinions of accurate and distinguished observers. The species seems widely distributed in the Atlantic States, from Michigan southward,

though few collectors have been fortunate enough to find it more than once. He who shall make known the manner of its life will have done something for science.

Mantura floridana, Cr. The difference in colour between the specimens found here and in Florida is very noticeable; here it is a rufous brown colour above, with the apical third of the elytra paler, the colour insensibly fading into that of the disk without much contrast. There it is larger, piceous black, apical third pale whitish, with the separation of the colours sharply defined, very much as in *Cercyon prætextatum*. The characters are the same, though they look enough unlike to be different species.

Mesites subcylindricus Horn. I took here a pair of this and would have had difficulty in recognizing with certainty the female had the male not been present. The male described by Dr. Horn was probably above the average size, .26 inch. I have two, measuring .18 and .23 inch.; and a female .22 inch. The male and female differ greatly in the appearance of the beak; in the female it is longer, strictly cylindrical, highly polished, a little dilated at apex, impunctate except a few coarse punctures at base, where there is also an elongate impression and a puncture between the eyes, which are small; the antennæ are inserted so close to the eyes as to be sub-contiguous, and the scrobes are obsolete. In the male it is as described by Dr. Horn, in substance, round, flattened above and below, dilated over the insertion of the antennæ, a short canaliculation near base, a puncture between the eyes, and surface apparently longitudinally strigose, with fine shallow punctures; antennæ slightly post-median. It seems rare.

Cnesinus strigicollis Lec. Occurs here occasionally on Osage Orange, which it probably followed from the south.

A GORDIIDIDE FOUND IN BRASSICA OLERACEA.

Whether the individual alluded to is a *Gordius*, or of some allied genus, my limited knowledge of the *Annelida* does not permit me to determine. In September a German gardener brought to me what he called a "cabbage snake, a dangerous thing full of poison," the bite of which he veraciously assured me he had known in Germany to produce a "felon." He had taken it from the middle of a head of cabbage which he had split open. It was entirely white (the color of the cabbage), as

thick as a common knitting needle, and twenty-three inches long, as nearly as it could be measured. I kept it in a 4-ounce bottle in hydrant water, which was changed occasionally. It amused itself by looping into all sorts of complex knots, and again straightening out, but so slowly that its movements were tedious to observe. With age the colour faded to pale yellow. It lived till March, when unfortunately I supplied it with boiled water (cold, however,) from the hot water spigot, and when I observed it again it was lifeless, and had turned brown. It is now in alcohol. This occurred three years ago, and I was promised more specimens, but till date none have come to hand. My acquaintance with *Gordius* is limited to the statements found in works of entomology, where it is alluded to as parasitic only on insects and spiders. Though not strictly entomological, a paper from some one acquainted with this family would prove very instructive.

TEXAN FORFICULIDÆ.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

Only seven species of this family of Orthoptera are as yet known from Texas. More species must occur along the southern border, but so little attention has been paid to this family that it may be long before the fauna is fairly well known. Perhaps the publication of this list may help to swell the number. One species is described more fully than ever before for readier identification. All the species mentioned are briefly characterized in a synopsis of the N. American species in the Bulletin of the U. S. Geol. Surv. Terr., vol. ii., p. 249.

Labidura riparia (Pall.) A single specimen, from the collection of Mr. Uhler, was collected in (western?) Texas by Capt. (now Gen.) Pope, March 10.

Spongophora brunneipennis Serv. A common species, apparently, in all parts of the State. Mr. Belfrage has taken it at Clifton, and also in other parts of the State. Mr. Boll found it not uncommon at Dallas. Immature specimens were taken by him Feb. 17, and mature in bottoms on Feb. 23 and Aug. 19. This species is the *Forf. flavipes* of Schaum MSS., under which name I formerly distributed some specimens. I append a description drawn up from more than twenty specimens, mainly from Texas and Florida.

Head depressed next the hind border, elsewhere tumid, smooth, shining, blackish castaneous; the labrum, neighboring parts and palpi luteous, the basal joints of the outer maxillary pair obscured a little with fuscous; antennæ 14-15 jointed, luteous, a little tinged with brown beyond the base.

Pronotum as broad as the head, scarcely longer than broad, the sides and posterior border scarcely convex, posterior angles rounded, lateral edges a little marginate; surface of the color of the head, scarcely paler at the sides, slightly wrinkled, but otherwise smooth, flat on posterior half and sides, the rest a little tumid; a sharp median impressed line. Tegmina of the same color, nearly twice as long as the pronotum, slightly and broadly emarginate at the tip, slightly produced next the inner edge. Exposed part of wings nearly half as long as tegmina, honey yellow, with a broad inner and apical belt of dark castaneous, almost or quite as black as the tegmina; the extreme edge dull luteous. Legs uniform honey yellow.

Abdomen with nearly parallel sides in the male, a little convex in the female; dark, rich castaneous or mahogany brown, much obscured with black, especially on the sides, at the incisures and down the middle, and excepting the clearly colored terminal segment, distinctly punctate, less deeply on the terminal segment; lateral plications of second and third segments rather slight; last segment quadrate, twice as broad as long, with parallel sides, depressed in a triangular space next the posterior border (♂), or tapering a little, with a median longitudinal depression (♀), at the bottom of which is a slight longitudinal depressed line. Pygidium of female hardly extended, moderate in size, quadrate; of male large, triangular, with laterally produced angles, and a more or less broadly truncate apex, often laterally and concavely excised, the whole broader than long.

Forceps of female about half as long as the abdomen, simple, straight, horizontal, incurved at tip, pretty strongly depressed, bluntly pointed, the superior inner edge with a quadrate, laminate, depressed, blackened basal tooth, much broader than long, and followed, after a brief space, by a series of minute tubercles nearly to the tip; inferior edge blackened, minutely tuberculato-denticulate, the base largely and obliquely excised. Forceps of male slender, nearly two-thirds as long as the abdomen, horizontal, scarcely incurved, excepting at the rather bluntly pointed

apex, depressed, especially on the apical half, bluntly carinate on outer edge, inner edge arcuate, excised as far as the triangular, sharp, rather prominent tooth on the middle of the basal half; beyond, and sometimes previously, minutely tuberculate in a double series nearly to the tip.

Length of body, male, 8.5–11.25 m.m., female, 8–11 m.m.; of antennæ, 5–6 m.m.; of tegmina and wings, 4–4.25 m.m.; of hind femora, 2.1–2.4 m.m.; of forceps, male, 3.5–4.75 m.m., female, 2.5–3.5 m.m.

Forficula tæniata Dohrn. I have seen a pair of specimens from Mr. Uhler's collection, coming from Texas.

Forficula exilis Scudd. The only specimen known comes from Texas (P. R. Uhler).

I have also another Texan species of *Forficula* from Mr. Uhler's collection, but it is immature.

Labia guttata Scudd. Three specimens were taken by Mr. Belfrage in Bosque county.

Labia minor (Linn.) This widespread species has reached Texas, and is abundant there. Mr. Belfrage has taken many mature specimens in June and September at Clifton.

Labia melancholica Scudd. The single specimen known was taken by Mr. Belfrage (at Waco, or near Austin) on Feb. 24th.

PARTIAL LIST OF CAPSIDÆ TAKEN AT BUFFALO, N. Y.

BY E. P. VAN DUZEE.

For the last two seasons I have turned my attention more particularly to collecting the Hemiptera; and very naturally became deeply interested in the family of the Phytocoridæ, or Capsidæ, as they are generally called. They are the most distinctively northern family of the Heteroptera, as the Jassidæ are of the Homoptera; but they seem to have been neglected by European as well as American Entomologists, probably because of the variability of the species, and their frail structure which makes them difficult of preservation. The literature of the Capsidæ, though perhaps not as meagre as of the Jassidæ, is widely scattered and fragmentary as regards American species, and makes this a difficult family to study.

The species mentioned below have, with few exceptions, been taken with the sweep-net from grass, weeds, or low bushes, in open fields and

borders of woods and streams, within a radius of twenty miles from this city. I have marked with an asterisk such species as I have taken in Ontario, mostly at Ridgeway; but without doubt most of the species found here could be found on the Canadian side of the river.

* *Brachytropis calcarata* Fall., May to Aug. In damp situations.

* *Trigonotylus ruficornis* Fall., June and July. Not common.

* *Miris instabilis* Uhl., *M. affinis* Reut., May to Aug. Common in dry fields. The dark fuscous form is rare here. Some beautiful green examples taken at Ridgeway, Ont., May, 1886.

* *Leptopterna dolobrata* Linn., May to Aug. In dry fields. Probably our most abundant Hemipter. It attains full development about June 1st, and frequently appears in immense swarms in favorable localities.

* *Trachelomiris oculatus* Reut., June to Aug. Rare.

* *Trachelomiris Meillcurii* Prov., *Nabidea coracina* Uhl., June to Aug. Common in open rich fields.

Resthenia insitiva Say. One example of the form with black scutellum, taken July 4th, 1879.

Lopidea media Say, July, common. A few examples of the yellow variety, named *C. robiniæ* by Mr. Uhler, taken in July, 1885.

Phytocoris eximus Reut., July and Aug.

Phytocoris tibialis Reut., July and Aug. A handsome species, occurring in considerable numbers among rank weeds, near water.

Phytocoris pallidicornis Reut. One example taken at Colden, N. Y., July, 1885.

Phytocoris scrupens Say, June and July. Very variable. The most abundant form here is the pale or ochreous variety, generally taken on the Staphylea. One example of the typical form described by Say was presented to me by Mr. Ph. Fischer, who took it near this city, and with it another variety which may prove to be a distinct species; it has the pronotum black, with the narrow edge, and three longitudinal vittæ ochreous, and differs slightly in other respects from the ordinary forms of *scrupens*.

Phytocoris colon Say. Three examples taken in Aug., 1886. This species was described by Mr. Say in 1831, but seems to have been overlooked by later Entomologists until 1884, when M.

Provancher took it near Quebec. The present examples add a third locality where this interesting insect has been captured. As collectors turn their attention more to the Hemiptera, it will doubtless be taken in most of the Northern and Middle States.

Neurocolpis nubilus Say, July and Aug. Most abundant on sumach.

Dichrooscytus rufipennis Fall., July. Rare.

* *Calocaris rapidus* Say, June and July. Very common on flowers of the Compositæ.

Megacœlum fasciatum Uhl., July. Rare.

Lygus pabulinus Linn., July and Aug. Variable in size.

* *Lygus pratensis* Linn., June to Oct. Abundant.

* *Lygus flavomaculatus* Prov., *L. strigulatus* Walk., May to Oct. Very common.

* *Lygus invitus* Say, June to Aug. Another common species.

Lygus monachus Uhl. Rare. Kindly determined for me by Mr. Uhler.

* *Coccobaphes sanguinarius* Uhl., July and Aug.

Pœciloscytus basalis Reut., June to Sept. A very common and variable species on *Ambrosia*, thistles, and other weeds, particularly in dry fields.

* *Pœcilocapsus lineatus* Fab. June to August. Common.

* *Pœcilocapsus goniphorus* Say. May to Sept. Very abundant and variable. *Var. C.* Say and *Var. F.* Reut., seem to represent the two extremes as found here.

* *Pœcilocapsus dislocatus* Say. June. Not uncommon, and by Mr. Uhler considered as a variety of the preceding.

Pœcilocapsus affinis Reut. June. Rare.

* *Pœcilocapsus marginalis* Reut. June and July. This might easily be confounded with *var F.* of *goniphorus*, but on close comparison is readily distinguished by the several characters given by M. Reuter *(Capsinæ, Bor. Am., p.* 75.)

Systratiotus venaticus Uhl. July.

Systratiotus americanus Reut. July and Aug. Swept from rank weeds in damp situations. Determined by Mr. Uhler.

Camptobrochis nebulosus Uhl. Rare.

Orthops scutellatus Uhl. Not common. Colden, N. Y., July, 1886.

Orthops pastinaceæ Fall. The present examples seem to agree in every respect with Douglass and Scott's description of this species

in their "British Hemiptera," and I feel but little doubt about the determination, although I possess no European specimens for direct comparison. I think this is its first reported occurrence in this country. It is not uncommon here on Umbelliferæ, especially *Conium maculatum* and *Heracleum sativum*, from May to July; and like the preceding species, is variable in color and marking.

* *Capsus ater* Linn. May to Aug. Abundant everywhere.

Monalocoris filicis Linn. July and Aug. Common on various ferns in deep woods. I have rarely taken it in open sunny places.

Sericophanes ocellatus Reut. Rare. Swept from grass in a dry meadow in June.

* *Ilnacora Stalii* Reut. July and Aug. Swept from coarse weeds in damp places.

Pilophorus bifasciatus Fab. July and Aug.

* *Pilophorus confusus* Kirsch. June to Aug. Not uncommon on pines and other trees.

* *Globiceps flavomaculatus* Fab. June and Aug. The macropterus form rare.

Garganus fusiformis Say. July and Aug. Generally taken in company with *Lopidea media* Say.

* *Stiphrosoma stygica* Say. June and July. Very common, especially on wild sunflowers.

Halticus bractatus Say. July. But one fully developed specimen taken. The undeveloped form common.

Halticus apterus Linn. July. Common.

* *Idolocoris famelicus* Uhl. May to Aug. Not uncommon.

Idolocoris agilis Uhl. July and Aug. Not uncommon. Most of the specimens which I have examined have the pronotum and scutellum entirely black. Occasionally an example occurs with the yellow markings as described by Mr. Uhler.

Macrocoleus coagulatus Uhl. June to Aug. Dry dusty roadsides; swept from grass and low weeds.

Episcopus ornatus Reut. Two examples of this pretty little Capsid occurred to me while sweeping weeds near this city, July, 1885.

Plagiognathus obscurus Uhl. July. Abundant on various Composite flowers.

Agalliastes associatus Uhl. June to Sept. All the examples I have taken differ from Mr. Uhler's description in having the posterior femora mostly black. This, with many other species of Hemiptera, were kindly determined for me by Mr. W. H. Ashmead.

Agalliastes pulicarius Fall. Not uncommon at Colden, N. Y., in July. No other localities are known to me. It is a common European species; but seems not to have been heretofore reported from this country.

Agalliastes verbasci H. Schaf. June and July. Common on mullen.

Besides the 53 species enumerated above, I have taken 25 species in this vicinity which, through the want of the proper material, etc., I have as yet been unable to satisfactorily determine. The present list, although fragmentary, indicates an interesting field open to northern collectors; and we notice with pleasure an increasing interest in the Hemiptera, which have been for so long neglected.

SOME FURTHER NOTES ON PHYSONOTA.

BY F. B. CAULFIELD, MONTREAL.

On May 23rd of the past year (1886) I again found *Physonota helianthi*, Rand., on its food plant *(Helianthus decapetalus)* in the same locality as in the previous year. The insects were now in the spring, or what I would call their nuptial dress, and were entirely of a bright golden green, with the exception of the margin, which is transparent with pearly reflections. In the fall dress the elytra are black, irregularly spotted with white, the thorax white with five black spots. In the spring dress the thorax is concolorous with the elytra, and bears *only three black spots, the anterior double spot being entirely absent.*

During the past summer I examined many specimens belonging to different colonies, and all were alike in this respect. They appeared to be much more lively than in the fall, creeping about the plants and pairing. A specimen taken in the hand, after a few feints, spread its wings and flew quickly to some shrubs a few yards distant. I brought home a pair taken *in coitu*, in the hope of obtaining eggs, but did not succeed, although they fed and paired freely in captivity.

On the 25th, they began to lose the bright golden green, changing to a dull yellowish green. As the bright green disappeared, the black top of the head became visible through the thorax, showing the double anterior spot of the form *5-punctata.* On dissecting specimens and removing the head, I found that the anterior spots are transparent, while the posterior spots being opaque, are not affected by seasonal changes of colour. In the nuptial dress the anterior spots are concealed by the bright green, giving a three-spotted form *(helianthi)*, but in the fall dress the black top of the head is seen through the transparent spots, producing the form *5-punctata.* On June 12th, I again visited the colony, and found several couples paired. Many of the females were gravid, but no eggs were found. All the beetles were in the nuptial dress. Visited it again on June 19th, with the same result. On June 26th, I tried again and found several groups of young larvæ, showing that I must have overlooked the eggs, although I had searched carefully for them. Some of the larvæ had moulted and the cast skins were on the leaves. As the larvæ were of two sizes, eggs had probably been deposited a week or two previous. All the larvæ were on the under surface, but had eaten holes through the leaf by which their presence could be easily detected. These young larvæ are of a paler green than when full grown, and the yellow stripes are not so bright and are broken up into spots, giving them a grayish appearance. Their presence on the under surface of the leaf, near its extremity, gave me a clue to the whereabouts of the eggs, and after a little further search I succeeded in finding them. They are deposited in an irregular cluster attached to the under surface of the leaf, about half an inch from the tip, just where it tapers off. The egg cluster is just the width of the narrow portion of the leaf, and is about the size of a pea. In general appearance it closely resembles a gall. In shape it is roughly pyramidal, the base being attached to the leaf. Its colour varies from green to pinkish brown, the colours generally appearing in blotches. The eggs are arranged in horizontal layers lengthwise with the leaf, the number decreasing to the apex. They are of a greenish white colour, elongate oval, smooth. They adhere strongly to each other and are surrounded by a tough covering or envelope, no doubt exuded by the female. The eggs are not so firmly attached to the enveloping substance as to each other, and can be detached with a little care. One cluster that I counted contained twenty-three eggs, and this, I think, judging from the groups of young larvæ, would be about the general number. When emerging, the larvæ either work their way out

between the covering and the leaf, or cut a hole through the side ; the former is, I think, the plan generally adopted, as I found many clusters partly separated from the leaf and slightly raised, but only a few with a hole cut in the side. The latter may perhaps be the work of a parasite.

July 10th.—Only a few beetles seen, but all were in the nuptial dress. Larvæ abundant.

July 24th.—Only one beetle seen, still in the nuptial dress. Larvæ of different sizes plentiful. Some full grown larvæ brought home at this date produced the beetle the first week in August, all in fall dress, black and white ; five black spots on thorax.

August 7th.—Nearly all the larvæ being about full grown, have scattered over the leaves. Found one group lately emerged and one egg cluster not yet hatched. Found three pupæ, one on under surface of leaf, two on upper, and one larva about to pupate on upper surface of leaf. Found one beetle in nuptial dress and one in fall dress. The former with three spots on thorax, the latter with five.

August 14th.—Found one beetle in nuptial dress ; those in fall dress becoming plentiful. Could find no fresh egg clusters. Larvæ of different sizes still on the plants.

August 21st.—Beetles in fall dress abundant, none seen in nuptial dress ; none seen pairing or moving about. A few larvæ still on the plants. Boxed five beetles for home observation.

August 26th.—Three of the beetles, 2 ♂, 1 ♀, taken in black and white dress on August 21st, have changed colour to dull green, with a slight showing of the bright, golden green of the nuptial dress. A larva taken on same date has given a dipterous parasite now in cocoon. This parasite emerged August 30th, but the wings did not fully expand. It belongs to the Tachinidæ, but I have no means of identifying it. It is rather smaller than a common house fly, and darker in colour.

August 27th.—The bright golden green showing more plainly on the three beetles ; the anterior spot on thorax being now a patch of bright green, and the white spots of elytra have almost entirely disappeared.

September 1st.—The three beetles entirely bright golden green ; three spots on thorax. The other pair retained the black and white dress unchanged, all being kept under the same conditions. None paired or ate anything, generally resting quietly on the sides of the box. All died before the end of the month.

September 18th.—A few beetles seen, all in fall dress. One larva found. This larva was brought home, but died before pupating.

October 9th.—Searched again for *Physonota*, but could fine none. Food plant almost entirely dried up and withered, so that the beetles had probably gone into winter quarters.

From these observations we may sum up the history of *Physonota* as it occurs in this locality somewhat as follows :—With the return of summer the beetles leave their winter quarters, in which dress I have not yet been able to ascertain, but by the latter end of May all are in the nuptial dress. They then pair, and through June and July deposit eggs, the bulk of these being laid during the former month. The larvæ when young are social, but when nearly full grown separate, pupating on the leaves. The beetles from these issue from the beginning of August to near the end of September ; the larger number appearing in August. These are all in the fall dress of black and white, and hybernate before pairing.

The places in which I find the species being rough ground overgrown with plants and shrubs, I have, so far, failed to find them in their winter quarters.

As three of the beetles changed from the black and white of fall to the nuptial dress while in confinement, we might expect to find them do so under natural conditions, but two seasons' observations seem to prove the contrary. Possibly in a more southern locality the species may be double-brooded.

BOOK NOTICE.

The Butterflies of North America. By W. H. Edwards. Third Series, Part I. Houghton, Mifflin & Co., 4to., Boston. Price, $2.25.

It is with very great pleasure that we receive from our esteemed contributor, Mr. W. H. Edwards, the First Part of the Third Series of his magnificent work, "The Butterflies of North America."

The last part of Volume II. was issued in November, 1884. It is a matter of deep congratulation to all Lepidopterists that the talented author now sees his way to resume publication ; but we regret exceedingly to learn from a notice in Science, of 4th February, that to enable

him to continue his unselfish labours he had to sacrifice many of the valuable type specimens in his collection.

The Part which has just come to hand contains three plates and nine pages of descriptive letter-press. Of the former, which have been executed under the supervision of Mrs. Mary Peart, it is not too much to say that they are exquisite, and are all equal to the very best in Vols. I. and II.

Plate I., which is accompanied by a complete life history, illustrates *Colias Eurydice* Bd., var. *Bernardino* Edw., in all its stages, from egg to maturity, and also a female of var. *Amorphæ* Hy. Edw.

On Plate II. we have a life-like representation of *Argynnis Nitocris* Edw., male and female.

On Plate III. we find figures of *Argynnis Lais* Edw., a pretty little species (but belonging to the same group as *Cybele*, *Atlantis* and *Electa*), discovered in the Northwest Territories by Capt. Gamble Geddes, in July, 1883. The artist has been particularly happy in the coloration of this plate, especially so in catching the peculiar dull ochrey-brown tint which is characteristic of the female. Of most interest to Canadians, however, is the fact that although this species is abundant in certain parts of the Northwest Territories, easily accessible, and comparatively well settled, nothing is known of its preparatory stages. The eggs of the species belonging to the same group are easily obtainable by tying females over growing plants of violets. Surely some of the readers of the Canadian Entomologist have friends living in the Calgary District, or at McLean, where it is very abundant, who, even if not entomologists, would, were the scientific importance of the results placed before them, at any rate take the trouble to confine a few females in gauze bags over living plants, and send Mr. Edwards the eggs. There is very little trouble about this matter ; living roots of violets can be sent by mail in a piece of oiled-paper, and will grow easily, if kept watered, in any of the tins used for canned vegetables (flower-pots are rare commodities in the N. W. T.) All that is necessary is to bend two pieces of wire so as to make a pent-house over the plant, and then placing a bag of muslin over the whole, secure it by means of an elastic band round the top of the can. This should be kept out of doors in a shady spot.

The importance of Mr. Edwards's studies on the Diurnal Lepidoptera of North America is perhaps hardly appreciated, until we remember that, with the exception of a few of our commonest butterflies, almost nothing

was known of their life-histories until he turned his attention to them in 1868. At the present time, however, it is far otherwise; for by close study, diligent care, and accurate observation, he has himself worked out the complete life-histories of a large proportion of the recorded North American species. Moreover, many discoveries of great interest have rewarded his constant efforts: The tri-morphism of *Papilio Ajax* and *Colias Eurytheme*, the seasonal dimorphism first of *Grapta Interrogationis*, then of others in the same genus, as well as the effects of cold upon larvæ and the perfect insects, may especially be referred to.

There was a marked advance in Vol. II. over Vol. I. in the amount of information given concerning the life-histories of the species described. This is accounted for in the prefatory notice of the present part as follows:

"When Vol. I. was undertaken, in 1868, nothing was known by myself or any one else, of eggs, larvæ, or chrysalids, except of the more common butterflies. As an egg or larva could but rarely be traced back to a particular female, it was impossible that much knowledge could be gained of the life-histories. Scarcely any advance in this respect had been made, in fact, since the time of Abbott, about 1800." . . . But in 1870, I discovered an infallible way to obtain eggs from the female of any species of butterfly, namely, by confining her with the growing food-plant . . . and from that day to the present I have so obtained eggs at will . . . and have reared larvæ without end. In this way, many cases of polymorphism have been established, and the position of many doubtful forms settled. A light has also been thrown on the limits of variation in species. In every case I have preserved descriptions of the several stages . . . Of a large proportion, also, Mrs. Peart has executed colored drawings, magnified when necessary, and my albums contain nearly one thousand figures."

Mr. Edwards concludes: "And so, in this Christmas time of 1886, I commend Vol. III. to the good will of the friends who have made my small audience for so many years."

Surely we may go further—a long way further—than this, and commend it not only to the few friends who have had the good fortune to listen to Mr. Edwards's teaching in the past, and perhaps to catch some of his enthusiasm; but also to every Entomologist or possessor of a library, whether in America or any other part of the world, who wishes to

have the most complete, as far as it goes, accurate, and, for the style of the work, the cheapest—in short, *the best*—work yet published upon the Butterflies of North America. J. FLETCHER.

ON HEMARIS DIFFINIS, BOISD.

BY A. R. GROTE, BREMEN, GERMANY.

In my own collection I labelled a form in which a slight dentation of the terminal band on primaries was perceptible (and which in this respect agreed with Boisduval's figure in the Species General, and with Abbot's of *fuciformis)* as *H. diffinis*. It differed from *tenuis* by a greater breadth of band, a perceptible apical stain, a somewhat brighter or more yellow-haired body. Whether this was Mr. Strecker's *Aettira*, I knew not, since I was unacquainted with this author's work, having seen only his numbers on occasion. *H. tenuis* is more purely a black and yellow species, with no red; it is the smallest and commonest of our Northern forms; the bands narrow, quite even, black; the vitreous spaces seeming larger. Undoubtedly it will be labelled *diffinis*, as, before we wrote, everything was labelled *diffinis* or *thysbe* belonging to this genus. This genus is of the class I have called *progenera*, the species being near allied in all stages. Our forms (although *axillaris* strikingly contrasts with *tenuis)* are near together structurally; they vary in one direction, viz., the gradual increase of the apical red stain, of the width and dentation of the band of primaries, of general bulk. But they are all outgrowths of *fuciformis*, so to speak. They are quite different from *gracilis*. This latter, though very distinct, appears to me to be strictly congeneric with the European *bombyliformis*, rather than with *fuciformis*, to stand alone without near allies, hence I divided it sub-generically to draw attention to its value as compared with the *tenuis* series, among which the Californian forms which I know, *palpalis*, *thetis*, range themselves. Quite American, and therefore certainly to be considered by themselves, are the forms I separated under *Hæmorrhagia*. The mission of Entomologists is to discriminate, not to confound. If our categories are unstable, they may be corrected, but inevitably they must be erected with precision to avoid the popular error of confounding different looking insects under the same category and under the same name.

CORRESPONDENCE.

DANAIS ARCHIPPUS.

Dear Sir,—The butterfly *Danais archippus* is not only harmless, but beneficial. Its food plant *(Asclepias)* is very troublesome to farmers in this part. The butterfly almost always lays her eggs on the pedicel of the flower, so that when the larvae hatch, they attack the flowers and eat down into the ovaries. I have seen an umbel of flowers eaten almost entirely by two larvae. I think they are quite a check to this weed, hindering it from seeding. If they only fed on the leaves, they could not possibly hurt the plant. The mature larva does not feed on the flowers, probably because when it reaches maturity there are not many flowers left.

GEORGE HALEY, Brownfield, Maine.

OPHELETES GLAUCOPTERUS PARASITIC UPON CIMBEX AMERICANA.

Dear Sir,—In the autumn of 1884, I picked up in my garden a larva of *Cimbex Americana*, Leach. This has always been one of my favourite insects, not only for the beauty of the pale yellow larva, with the stripe of deep black down the centre of its back, but also on account of the interest which centres around the emergence of the imago in spring, to see, should it chance to be a female, to which of the three "varieties" it might belong. As the larva in question was apparently full fed, I placed it in a box with some earth and a few of the leaves of its food-plant (*Ulmus Americana*, L.) and in a few days it spun its hard, brown cocoon. The following spring, on looking into the box, I was much pleased to find, instead of the well known, gaudy and clumsy Cimbex, a fine female of the handsome Ichneumon fly, *Opheletes glaucopterus*, Linn., a species not at all common at Ottawa. J. F.

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ORYSSUS SAYI, Westwood.

BY W. HAGUE HARRINGTON, OTTAWA.

At the Annual Meeting of the Entomological Society of Ontario in October, 1885, I read a brief note on *Oryssus Sayi*, which was afterwards published in the Canadian Entomologist (vol. xviii., page 30). It recorded the capture of two ♀ and one ♂ on cedar telegraph poles, and suggested that they might have emerged therefrom. During the early summer of 1886, I added several specimens of Oryssus to my collection, and what is of much more importance, succeeded in gaining a more definite knowledge of the habits of our species. As no account, other than the brief note just cited, has ever appeared in the Entomologist of these handsome and interesting insects, I propose to give a brief paper upon them.

The genus was established by Latreille, according to Westwood (Introduction to the Modern Classification of Insects, vol. ii. app., page 55), and Lucas (Dictionnaire Universel d'Histoire Naturelle, vol. ix., page 230), although Norton, in his Catalogue of the Tenthredinidæ and Uroceridæ of North America (Trans. Am. Ent. Soc., vol. ii., page 350), and Cresson (*idem* vol. viii, page 48) credit it to Fabricius, as does also Provancher (Petite Faune Entomologique du Canada, vol. ii., page 237).

Westwood, in his generic synopsis of British Hymenoptera, *loc. cit.*, gives the following characteristics :—

Oryssus *Latr.*, one British species, type *O. coronatus* Latr.; cylindrical; antennæ ♂ 11-jointed, ♀ 10-jointed; max. palpi long, 5-jointed; ovipositor spiral, capillary.

Norton gives the generic features in more detail as follows :—

"Wings with one marginal and two submarginal cells, the first with two recurrent nervures; lanceolate cell closed; under wings without inner cell. Antennæ inserted at the nasus, 10-jointed in female, 11-jointed in male (Hartig says: ♀ 11-jointed, ♂ 12-jointed); the third and sixth longest, the joint before the last thickened. Head large, rounded, wider than thorax. Mandibles short; labrum entire with two slight lateral im-

pressions ; maxillary palpi long, 5-jointed, labial palpi 3-jointed. Ovipositor concealed in a groove beneath, springing from the last segment, long and very slender. It is ordinarily concealed in a channel beneath the abdomen, but is capable of being extended, for which purpose it can be curved at the base. The terebra is formed like that of Urocerus. The anterior lobe of the mesothorax is wide and extended back to the scutellum, while the side lobes are very small. The scutellum is widened and large. Anterior tibiæ with one end spur, simple in the males, dilated and incised in the females. Tarsi 5-jointed in males, 3-jointed in females."

Having now some knowledge of the genus, we can proceed to consider the species. I have not been able to examine a catalogue of European Hymenoptera, but the various authors consulted mention two species. One of these is *O. coronatus* Latr., the type of the genus ; the name of the other is not given. Lucas, *loc. cit.*, briefly describes *O. coronatus* as " 12 m. long, of a shining black, with the abdomen of a tawny red ; the two first segments black, and the last ornamented with a white spot in the males only." This description would apply equally well to a specimen taken by Mr. Fletcher in Vancouver Island, and the figure given might also answer for this specimen. It may, however, have other features sufficient to readily distinguish it from our species. It inhabits chiefly the central part of France and some portions of Germany.

The two European species were for a long time the only representatives of the genus known to Entomologists, and the American species were apparently first brought to their notice by Harris. In his " Catalogue of the Insects of Massachusetts," published in 1833, he enumerated three undescribed species, and in the second edition, 1835, he gave to them the following names : *O. hæmorrhoidalis*, *O. maurus* and *O. affinis ;* signifying respectively the red-tailed, the dark-coloured, and the allied. No description of them was published by him until 1841 in his Report on Injurious Insects. In 1838, Newman (Ent. Mag., vol. v., page 486) described the first of these insects under the name of *O. terminalis*, and Westwood (Zool. Jour., vol. v., page 440) described the second in 1835 as *O. Sayi*, having received a specimen from Say. No additional species were recorded until 1879, when Cresson (Trans. Am. Ent. Soc., vol. viii., page 48) described *O. occidentalis* from Colorado and Nevada, and *O. Mexicanus* from Mexico.

All these species have been described from single specimens, or at the most from a very limited number, and the insects have always been rare,

as is evidenced by Norton's statement that he had not seen either *hæmorrhoidalis* or *maurus*.

The first record of a Canadian specimen is by Westwood, who described the ♂ of *Sayi* from one taken in Nova Scotia, the ♀ having been sent by Say from Indiana. Provancher records the occurrence of *hæmorrhoidalis* in the Province of Quebec, a single ♀ having been captured by him.

The first specimen which came under my personal observation was a ♂ captured by Mr. Fletcher in this city in 1883. This insect, through the kindness of Mr. Guignard, is now in my collection under the name *occidentalis*. It was not until 1885 that I succeeded in capturing specimens, as described in the note mentioned at the commencement of this paper. Last year, 1886, I was more successful, and not only found several specimens, but was able to learn something definite as to their habit of life. Between the 9th and 23rd June, I captured more than a dozen, including representatives of all the American species except *Mexicanus*.

After a very careful comparison of these and other specimens with one another, and with the descriptions of the several species, I am convinced that they are all varieties of one species, and that there are at the most only two American species, namely, *O. Mexicanus* Cresson, and *O. Sayi* Westwood, whose name takes precedence over those of Newman and Harris. The latter, indeed, stated that his *affinis* might be identical with *maurus*, as it differed only in having the face entirely black and the feet reddish. Provancher (Additions and Corrections, page 27), after recording the occurrence of *occidentalis* at Ottawa, states that the examination of a number of specimens might possibly prove it to be identical with *hæmorrhoidalis*.

As Harris did not publish descriptions when he named his species, those of Westwood and Newman must replace them, and the species will stand at present :—

1. *Oryssus Sayi*, Westwood—1835 = *hæmorrhoidalis*, Harris.
2. *terminalis*, Newman—1838 = *maurus*, Harris.
3. *affinis*, Harris—1841.
4. *occidentalis*, Cresson—1879.

I have before me twenty specimens which may in accordance with descriptions be distributed as follows :—

No. 1. Two ♀ (one taken by Mr. J. D. Evans at Sudbury), one ♂.

No. 2. Nine ♀, one ♂ (taken by Mr. Fletcher at Victoria, V. I., 24-5-85.)

No. 3. One ♀ (from Rev. Geo. W. Taylor, Victoria, V. I.), three ♂.

No. 4. Two ♀, one ♂.

Although readily separating into these groups, they do not offer any differences of structure sufficient to constitute distinct species. Nos. 1 and 3 have the abdomen entirely black, except that the ♂ of No. 1 has a triangular white spot on apex. No. 2 has four segments black, except the ♂, which has only two, as in the European *coronatus*. No. 4 has only the first segment black, and the ♂ has a white spot on apex.

The antennæ and legs of all have white markings, varying slightly in extent, and Nos. 1 and 4 have short white lines on face. In the specimens from Victoria the smoky band of the anterior wings extends to the tip and also towards the base.

I have vainly sought to find a record of any definite information as to the life history of Oryssus. Regarding the European species, Lucas, *loc. cit.*, says "they are found in our woods, in the spring-time, resting upon old trees exposed to the sun, and often upon those which have been cut; they run very quickly in a straight line, moving also sideways, and even backwards. Fir trees, beeches and oaks are the trees that they prefer." Brullé (Hist. Nat. des Insectes, *Hyménoptères*, vol. iv., p. 638) quotes Dahlbom as placing Oryssus near Cynips, and conjecturing that the larvæ live in galls. Blanchard (Les Métamorposes des Insectes) states that these insects have, "but without doubt wrongly," been attached to the Uroceridæ, and that they are "rare Hymenoptera yet unknown in their transformations; remarkable for the ovipositor of the females, slender and folded under the abdomen. The type, *O. coronatus*, is sometimes met with in the middle of France." Glover (U. S. Ent. Rept., 1877, p. 94,) affirms that "the larvæ bore in the wood of the willow." This is probably an inference on his part from the statement of Harris, that "these singular insects were taken upon a willow tree by my friend the Rev. L. W. Leonard" (Dublin, N. H.) Norton says, "little is known of the larva. Latreille and Klug suppose that they exist upon the wood of standing trees. Scopoli found them upon fir trees, and Latreille upon old house-beams." Provancher merely remarks that the larvæ are supposed to live upon conifers; living trees according to some, and dead ones according to others.

My specimens have, with the exception of the three noted from

telegraph poles, all been taken from old sugar maples, *Acer saccharinum ;* the majority of them upon large dead trunks. They were all captured in June upon the following dates : 9th. One male and three females, one of which was under the loosened bark ; two others seen. 10th. Two captured and one seen. 11th. Three ; one of these was observed just cutting its way through the wood, and its exit was accelerated by the cautious use of a penknife. This was in an old dead trunk, the bark having fallen off and the wood being very dry and hard. It was on this portion of the tree particularly that the insects were observed. 16th. One. 20th. Two. 23rd. One, a female, which was found ovipositing in the place just described, the tip of the abdomen being applied closely to the surface of the wood.

These observations prove that one breeding place of these insects is the wood of old dead sugar maples, and it may be assumed that they also infest the willow, and possibly a variety of trees. Having determined so much, it is hoped that some of our members may succeed in observing the larvæ, and discover whether they are lignivorous or parasitic in their habits. The former probably, but it would not be safe to take it for granted. Insects differing so greatly from other members of the Uroceridæ in structure may perhaps have habits as widely divergent from those of their associates.

For the benefit of those who may wish to make further observations on the habits of these insects, I will briefly describe their appearance : They are stout, black, cylindrical ; varying in length from less than two-fifths to nearly three-fifths of an inch. The face is very coarsely punctured, sometimes with a short white line on each side ; the vertex prominent, and the lower ocellus surrounded with conspicuous tubercles ; eyes moderately large. The antennæ are peculiar : in the male they have eleven joints, the third slightly longer, and four to eleven subequal ; in the female they have, however, only ten joints, of which four, five and ten are very short ; in both sexes they are touched with white near the middle. The wings are hyaline, with a broad smoky band commencing near the stigma and extending almost to the tips. The legs have a spot on the tip of the femora, and a line on the tibia without, white. In the female the anterior pair are swollen, the tibiæ crooked, and the tarsi with only three joints. The abdomen has the basal segment very coarsely punctured, or scabrous ; the remaining ones polished, shining, varying in color as previously mentioned.

The ovipositor is of special interest, as it differs remarkably from those of other Uroceridæ. Usually it is not visible, as when retracted the tip is concealed in a deep cleft in the terminal segments. It has the appearance, as stated by Norton, of springing from the last segment, but it is evidently attached much nearer the base of the abdomen, and is protruded from beneath a small ventral scale which is apparently a portion of the fifth segment. It is very slender, hair-like, and nearly twice as long as the insect, and must consequently be coiled within the abdomen in a manner somewhat similar to that of Ibalia. Norton says it is ordinarily concealed in a channel beneath the abdomen; Brullé, and other authors, as rolled spirally within it.

The insects are very lively in their motions, running actively to and fro, and always on the alert. They have at such times a marked resemblance to some species of wasps, and might be easily classed as such by casual observers. When disturbed they dart swiftly away, but will generally be found shortly afterwards near the same spot, so that one may frequently, with a little patience, succeed in capturing them, even if they have been missed at the first attempt.

In conclusion I will recapitulate what I have been able to learn of our Canadian species. Its range embraces a vast extent of country, from ocean to ocean, and apparently far northward.

O. Sayi, Westwood.—Ottawa, Sudbury, Nova Scotia.

var. *terminalis*, Newman.—Ottawa, Quebec, Vancouver Island.

var. *affinis*, Harris.—Ottawa, Vancouver Island.

var. *occidentalis*, Cresson.—Ottawa.

Breeds in dead, or old decaying sugar maples, and appears in June.

ADDITIONS TO LIST OF MONTREAL LEPIDOPTERA.

BY G. J. BOWLES, MONTREAL.

During the years 1875, 1876 and 1877, Mr. F. B. Caulfield published in the CANADIAN ENTOMOLOGIST lists of the Lepidoptera occurring at Montreal and vicinity, as far as the end of the Bombycidæ. Since that period the following species have been taken here, and are now added so as to make the list as complete as possible to date. Chateauguay is on the south shore of the St. Lawrence, directly opposite the upper part of the Island of Montreal, and only a few miles distant.

DIURNA.

50. Papilio cresphontes, Cramer. Several examples taken by Mr. J. G. Jack at Chateauguay.
51. Argynnis bellona, Fab. Not common. Taken at Chateauguay and Lachine Flats.
52. Euptoieta claudia, Cram. One specimen by Mr. Jack, Chateauguay.
53. Grapta satyrus, Edw. One specimen, Mr. Pearson, Chateauguay.
54. Thecla acadica, Edw. Very rare, Mr. H. H. Lyman.
55. Amblyscirtes vialis, Edw. Rare, Mr. Lyman.

NOTE.—Of Grapta comma, the forms *dryas* and *Harrisii* have been taken, and of Lycaena pseudargiolus, the forms *violacea* and *neglecta*.

SPHINGIDÆ.

20. Deilephila lineata, Fab. Very rare, Montreal Mountain.
21. Philampelus achemon, Drury. Very rare, larva found feeding on vines in city.
22. Ellema bombycoides, Walker (Harrisii, Clem.) Very rare.

AEGERIADÆ.

3. Trochilium tibiale, Harris. Rare.
4. Albuna torva, Hy. Edw. Rare.

BOMBYCIDÆ.

60. Clemensia albata, Pack. Rare, Montreal Mountain.
61. Parorgyia Clintonii, G. & R.
62. Phobetron pithecium, A. & S.
63. Limacodes fasciola, H. S.
64. Ichthyura inclusa, Hub.
65. Ichthyura albosigma, Fitch.
66. Datana integerrima, G. & R.
67. Gluphisia trilineata, Pack.
68. Notodonta basistriens, Walk.
69. Lophodonta angulosa, A. & S.
70. Oedemasia badia, Pack.
71. Heterocampa biundata, Walk.
72. Heterocampa cinerea, Pack.
73. Heterocampa unicolor, Pack.
74. Prionia bilineata, Pack.
75. Dryopteris rosea, Walk.

All the above species are rare.

76. Prionoxystus querciperda, Fitch. This borer has been taken by Mr. Keutzing in a small grove of oaks at Hochelaga, the only known locality near Montreal.

NOTE.—Of Callimorpha Lecontei, the varieties *confinis* and *contigua* are not uncommon.

FURTHER ADDITIONS TO THE LIST OF CANADIAN MICRO-LEPIDOPTERA.

BY J. ALSTON MOFFAT, HAMILTON, ONT.

Last season being but a poor one for the Lepidopterist in this locality, I got but little that was new to me in this department. Being in communication with Prof. Fernald about the few I had in duplicate, I proposed to send all my single specimens to him, to name what he could and return them to me again. The Professor most generously consented to the very exacting conditions, and returned my insects, which made the double journey by express, without a break, accompanied with the following names :—

34. Botis unimacula, G.–R.
35. Diathrausta octomaculalis, Fernald.
36. Nephopteryx undulatella, Clem.
37. Salebria fusca, Haw.
38. do contatella, Grote.
39. Meroptera pravella, Grote.
40. Ephestia ochrifrontella, Zell.
41. Crambus caliginosellus, Clem.
42. do fuscicostellus, Zell.
43. Propexus pexellus, Kad.
44. Schoenobius Clemensellus, Robs.
45. Teras maculidorsana, Clem.
46. do Logiana, Schiff.
47. do americana, Fern.
48. Loxotænia virescana, Clem.
49. Lophoderus triferana, Walk.
50. Amorbia humerosana, Clem.
51. Œnectra irrorea, Robs.
52. Cenopis reticulatana, Clem.
53. do Groteana, Fern.
54. Dichelia caryæ, Robs.
55. Platynota exasperatana, Zell.
56. do sentana, Clem.
57. Conchylis dorsimaculana, Robs.
58. Eudemis botrana, Schiff.
59. Eccopsis fasciatana, Clem.
60. Proteoteras Moffatiana, Fern. MSS.
61. Phoxopteris semiovana, Zell.
62. do dubiana, Clem.
63. do angulifasciana, Zell.
64. Depressaria atroclossella, Clem.
65. do applana, Fab.
66. Semioscopis allenella, Wlsm.

67. Semioscopis inornata, Wlsm.
68. Anesychia texanella, Cham.
69. Choreutis leucobasis, Fern., MSS.
70. Œcophora argenticintella, Clem
71. Gelechia innocuella, Zell.
72. do flavocostella, Clem.
73. do agrimoniella, Clem.
74. Gelechia bicostimaculella, Cham
75. Plutella cruciferarum, Zell.
76. Bucculatrix pomifoliella, Clem.
77. Adelia purpurella, Walk.
78. Dasycera newmanella, Clem.
79. Ypsolophus pometellus, Fitch.
80. Tinea granella, Linn.

There were six names besides these that were new to me, but not to the Canadian list. Twenty-five specimens were returned unnamed. Upon these the Prof. remarks: "Some of the unnamed ones are too poor to name; others are unnamed in my collection, and may or may not be new species; and still others I have not seen before."

I may add here the two following:—

Crocidophora serratissimalis, Zell. Identified by a specimen received from the Rev. Mr. Hulst. Not uncommon here, but resembling others, which makes it liable to be overlooked.

Margarodes quadristigmalis, Guen. Also identified by a sp. from Mr. Hulst; three taken here last summer for the first time. I also saw several of them when in London last October, in the collection made by Mr. Henry Saunders at electric light.

NOTE.—In Mr. Moffat's previous paper (C. E., vol. xix., page 4) the following errors require to be corrected:—

For "5. Arthena" read "Asthena."
"12. H. Harneiata" read "Harveiata."
"16. P. lunigerata" read "cunigerata."

And on page 5, line 18, for "C. lunigerata, var. dispunctaria," read "C. cunigerata, var. disjunctaria."

STRAY NOTES ON MYRMELEONIDÆ.

BY DR. H. A. HAGEN, CAMBRIDGE, MASS.

1. *Palpares inclemens* Walk., p. 303, No. 4.

This is one of the largest species. Length of body, male 75 m.m.; fem., 60; exp. al., 145–160 m.m. I have before me a couple collected by Dr. Krauss, Stuttgart, on Cap. b. sp., from the collection of the late Dr.

Schneider, Breslau; and two females from Zanzibar, collected by Mr. C. Cooke, Salem, and a female from Zanzibar Island, from Mr. Thorey, Hamburg. It belongs to this species, *P. latipennis*, Gerstaecker, Insects from Zanzibar, 1873, p. 55; a female from the Galla land, 2° latit., which is compared with the male described by myself in Peters' Voyage, p. 99. But this last male is from Loanda (west coast), and not, as stated by Gerstaecker, from Mozambique. Dr. Krauss has collected from 1839 to 1840 on Cap. b. sp. and Natal. Therefore, as far as known to me, the range of this species goes from the Cape along the east coast to the equator. There does not yet exist a description of this species except Walker's, which is correct. I have compared (1857) my specimens with the types of *M. inclemens*, females, so that I have no doubt about the identity. The spots of the wings are sufficiently well described, but there is a character not mentioned which is important. The large transverse band of the hind wing, following the somewhat incomplete basal band, has always in its lower half a large horseshoe-like incision looking with the open side to the base of the wing. This incision is wanting in *P. latipennis* Gerst. The appendages of the male are short, 3 m.m. long, black, with dense black hairs, cylindrical, straight, very little curvated internally and at base; tip rounded, a little inflated, covered with short spines. Below at the base between the appendages is a short, dark, spoon-shaped plate, with a yellow spot on tip.

McLachlan unites *M. sollicitus* Walk. and *M. subducens* Walk., both nearly related to each other, with *M. cephalotes* Klug, as I believe, erroneously. Both are presented by Lord Byron from the Voyage of the Blonde, locality unknown. I have carefully compared the Voyage of the Blonde, because both insects are nearly related to *M. inclemens*, and supposed to be from Africa. The Blonde stopped at Madeira, October 18–23, going then to Rio. On the way home she came from Talcahuana, Coquimbo, to St. Helena Isl., staying there from January 23 to 28. All the time between these dates the Blonde was in the Pacific Ocean. In Madeira certainly these Myrmeleons have never been observed, and from St. Helena Island they have not been mentioned by any collectors since that time. We find it noted that many insects have been observed and collected during the stopping of the Blonde on the Society and Sandwich Islands. If my supposition is erroneous for the locality of the species, I am at least not able to understand how these Myrmeleons could have been brought home by the ships, except by a purchase in other harbors.

2. *Palpares latipennis*, Rbr.

I have never seen the type of Rambur, which McLachlan considers to be a good species. After Rambur's description, I have considered to belong to *P. latipennis*, two males from Angola and a female from the Senegal; one of the males is not now before me. After comparison with the types of Walker, I considered *M. cephalotes* Walk. (not Rambur) to be identical with his *M. furfuracens* (not Rambur's species, which McLachlan, after comparing the type, found new to him), and both were identical with my species. Prof. Peters brought home a male from Loanda a little smaller than the two males from Angola, but perfectly identical; it is now in the Berlin Museum. From those four specimens my detailed description is made in Peters' Reise nach Mossambique, vol. v., p. 99. My manuscript was delivered in 1853, printed in 1854, but published only in 1862. As I have not received any separata, and as the book is rather expensive, my work is very little known. I shall even now consider my species as *P. latipennis* Rbr., until the contrary is shown by evidence

Length of body, male, 66 m.m.; female, 55 m.m. (not perfect). Exp. alar., male, 118-136 m.m.; female, 144 m m. The appendages of the male, now broken, were 3 m.m. long, and similar to those of *P. inclemens*.

The species, though visibly smaller, is so similar to *P. inclemens* that it was very nearly believed that *P. latipennis* is a western variety, or at least a representative variation of *P. inclemens* from the east coast. The fact will have to be decided by a much larger material than the specimens at my disposition. The differences are (I can not now compare the appendages) the dilatation of the black middle band on the vertex, and the want of a transversal black band below the antennæ; the color of legs is more yellow, but in one specimen nearly brown; the front wings are narrower, less obtuse on tip, the large spots smaller, the apical one rudimentary; the hind wings are narrower, less obtuse on tip, the three basal bands smaller, connected with each other, the first basal band nearly rudimentary, forming only an indication of a narrow horseshoe-like incision; on the hind margin a number of rounded brown spots.

Knowing the variability of large Myrmeleon, of course my opinion of the difference of *P. inclemens* and *latipennis* has to be supported by a larger material; if I am right, and if *P. latipennis* Rbr. is surely different, a new name should be given for my species.

3. *Palpares cephalotes*.

Myrmeleon cephalotes, Klug, Symb. Phyr., i., iv., pl. 35, f. 1, fem.

This species has been misunderstood by all entomologists, and so by Rambur, Walker, McLachlan. As the latter says, "Klug n'en a cependant connu que la femelle," he cannot have seen the description where the forceps of the male is described. Professor Ehrenberg has collected a large number of specimens in Egypt and Dongola, and I have still before me two typical couples, with the name written by Klug still on the pins. Length of body, male, 67 m.m.; female, 58 m.m.; exp. alar., male, 126 m.m.; female, 140 m.m. Pale grayish, a brown dorsal band on the thorax ends narrowed on vertex; facies and mouth pale yellow; antennæ black, the two basal joints yellowish brown; palpi pale reddish brown; last joint of the labials a little incurved, fusiform on tip; mandibles black, shining, long, much more prominent than in the foregoing species; thorax white-villous; mesothorax above on each side with an obsolete stripe; legs ferruginous, femur on tip, tibia on base less dark; tarsi darker, of the female nearly blackish. Abdomen of the male pale, basal half enlarged, covered with a longer dense white villosity; appendages yellow, 6 m.m. long, curvated at the base and inward; space between ovoid; hairy externally; apical half inside with a black brush ending on the somewhat globose tip; each on the extreme base inside with two yellow elongated papillæ, with a black blunt spine as long as the papillæ, articulated to the tip of the papillæ; between and before the two appendages a small conical yellow part. Wings of the males nearly hyaline; smaller, elongated, narrower, tip less obtuse and more pointed than in the foregoing species; front wings with the ante-cubitals brownish at base; a row of small more quadrangular spots around the hind margin at the distance of 2 m.m.; basal part after the 5th vein with more small dots, reaching the hind margin; in the middle of the wings two small oval spots, oblique, about 6 m.m. long, and a more longitudinal one below on tip. Hind wings with few dots on the base of the ante-cubitals; a row of irregular, little larger dots along the hind margin, some of them reaching the margin; the row begins after the basal third of the margin, and ends on the tip; base to the fifth vein without spots; in the middle of the wing five pale brown narrow bands, of irregular shape, not connected, the apical one more or less divided. Wings of the female larger, broader; spots larger and darker, to blackish brown, the two penultimate bands before tip mostly connected; the pterostigma yellow. Abdomen of female brown below, before and around the anus a row of black strong spines.

I have described a larva which belongs very probably to this species.

4. *Palpares Burmeisteri*, Hag.

Myrmecoleon gigas, Burm., ii., p. 998, No. 25.

Palpares cephalotes, Rbr., p. 368, No. 3.

Dalman, Anal., p. 88, describes *M. gigas* only after Drury's figure, as Rambur has done also, but Dalman's description is very incomplete. Apparently the fact was overlooked by Burmeister, and as he had not at hand Drury's figure, he determined *M. gigas* after the insufficient description of Dalman. Burmeister's type from Winthem's collection, a female, is before me. I believe it is *P. cephalotes* Ramb., and therefore Burmeister's species has to be named, until it is proved by evidence that Rambur's *P. cephalotes* is a larger western form of Klug's species. As I have no male before me, I am unable to decide this question. The type is from Senegal. Length of body, 63 m.m.; exp. alar., 150 m.m.

Nearly related to *P. cephalotes* Klug., but larger, the wings broader, with a stronger tinge of pale brown, head broader, 9 m.m. (Klug's species 7 m.m.); vertex much more convex, with a broader black band (only dagger-shaped in Klug's spec.); black bands on thorax larger. Wings more blunt on tip, more spotted near the veins and especially near the hind margin; hind wings in the apical half of the hind margin a regular row of rounded brown spots, distant from the margin, and a row of smaller more irregular spots on the margin itself; this is not the case in Klug's species; of the large brown bands the penultimate is divided, and only the lower part united with the ante-penultimate band.

It would be useless to give more details till more material of both sexes is at hand.

(To be Continued.)

BOOK NOTICES.

THE HESSIAN FLY *(Cecidomyia destructor)* IN GREAT BRITAIN, by Eleanor A. Ormerod, F. R. Met. Soc., Consulting Entomologist of the Royal Agricultural Society of England. Pp. 24, 8vo., London, 1886.

The above is the title of an admirable pamphlet just issued by Miss Ormerod, and adds one more to the many boons for which the agricultural classes in England are indebted to this talented lady. Although all

the information published is contained in 21 of the small pages of a crown octavo pamphlet, so methodical is the arrangement and so concise are the statements, that it may be said to contain all that it is important for the farmer to know of what has been positively ascertained concerning the habits of this destructive insect and the most approved remedies for keeping it in check. With Miss Ormerod's pamphlet he can in a few minutes learn from her excellent illustrations whether an attack upon his crop should be ascribed to the Hessian Fly or not. And if so, he will also find himself provided with advice as to the best steps to take to limit the injury to the smallest possible amount.

Immediately upon the first appearance of the Hessian Fly in England, Miss Ormerod, with characteristic promptness, visited the fields attacked, and at once identified the marauder. That there should be no mistake in the matter, she referred specimens to the highest authorities, and amongst others to our ex-President, Prof. Saunders. All of them agreed with her that it was the true Hessian Fly. She then lost no time in writing to the newspapers and describing how the attack might be recognized. In a few weeks she had examined all the literature on the subject, and had accumulated a vast amount of information as to the extent of the injury committed; so that before the winter set in she was able to give the farmers good practical advice as to the best means of stamping out the new enemy. This she has now consolidated into the useful report under consideration. We have, first, a short historical sketch of the fly as an injurious insect; then an estimate of the injury caused during the past season in England and Scotland, which was considerable. In one English and three Scotch localities the loss was calculated to be several bushels to the acre. The appearance of the attacked crops is described in a plain, intelligible manner, together with the insect in its different stages, from the egg to the perfect fly, and an abstract is given of its life-history. The important question, "Where does the Hessian Fly come from?" is then discussed. This treats of the different means by which the insect may be introduced, and it is shown that it may come in the "flax-seed" state amongst seed-grain, or in straw which having come from infested countries either as straw-cargoes, or as packing, is used for horses and cows in London, and then sent out to farms in the country as slightly used litter, or as "long manure." When this is the case, says Miss Ormerod, "a sufficiently large proportion of the flies in the flax-seed state are likely to develop to cause mischief such as we have seen in the past season. On

the first farm on which the attack was observed near Hertford, I found on enquiry that London manure had been used of mixed kind, but mainly cow and horse manure in very 'long' condition."

An observation of the greatest importance was made by Mr. Palmer, of Revell's Hall, near Hertford, viz., that the "flax-seeds" are separated from the straw in threshing. This was previously thought not to be the case. As, however, they are thus loosened from the straw, they are, of course, liable to be mixed with grain, and with it transmitted from place to place; but in Mr. Palmer's case they were not found amongst the grain, nor in the chaff, but in the dust and rubbish which falls beneath the threshing-machine. In a handful of siftings he found no less than fifteen "flax-seeds." This rubbish is comparatively worthless, and if English farmers are careful always to burn it upon a waste spot, it will certainly reduce the number of the parent flies from which another serious attack may originate. It is the custom amongst our best Canadian farmers to do this in districts where the Wheat Midge ("Weevil") is prevalent, and is attended with very satisfactory results.

Our authoress continues: "From the above observations it appears that puparia, or 'flax-seeds' *may* be transmitted in corn rubbish. In samples of screenings and sweepings from imported corn, I have found, besides a large amount of live and dead beetles, also weed-seeds, smut and other matters undesirable to spread abroad (as may easily be done where these are used for poultry-food, and thus thrown out in farm-yards), and as, with these, broken bits of stem are to be found, it appears at least possible that 'flax-seed' may also be conveyed. In Dr. Packard's paper on the subject, he alludes to the possibility of the pest being transmitted in wheat."

The best methods of prevention are treated of at some length, and their applicability to the farming processes in vogue in England are reviewed. The favourite preventive remedy—late sowing—is shown to be applied in England as an ordinary part of the regular arrangements of the work on most farms; as a rule wheat is not sown until some time after the 20th of September, the date which we consider the latest it is necessary to wait to avoid attack, and thus the young wheat plants are not up till after the autumn brood of the fly is dead. The importance of this point cannot be laid too much stress upon, for if late sowing be regularly practised, the Hessian Fly must be dependent for its subsistence upon self-sown plants in fields which had been attacked, or upon rye or other

grain sown as sheep-feed. This reduces to narrow limits the lines in which experiments may be successfully tried to prevent this enemy to England's staple crop from establishing itself and getting beyond the control of the farmers.

Perhaps the most satisfactory feature about this outbreak of the Hessian Fly in England is the fact that it has appeared in so many places, and has thus been brought forcibly before the attention of farmers in all parts of the kingdom, and they, being aroused, will now see the necessity of promptly carrying out the instructions necessary for its extermination.

The Royal Agricultural Society through Miss Ormerod, and the Government through Mr. Whitehead, have done everything in their power to apprise the farmers of their danger, and have put in their hands as weapons with which they may confidently hope to cope successfully with their new enemy, concise information as to its life-history and habits which will enable them to recognise it at once, and apply without delay the proper treatment. Briefly, this consists of (a) late sowing of the main crop, so that there is no accommodation ready for the autumn brood, by which a large proportion will necessarily perish without egg-laying; (b) feeding off or ploughing in any early-sown or volunteer crops which may be found to be infested, so that the eggs and maggots may be destroyed; and (c) deep ploughing, by which loose puparia or infested stubble may be buried too deep in the ground to allow the perfect flies to emerge.

From the historical sketch which is given of the occurrence of *C. destructor*, it would appear that although a watch has been kept upon it since its first outburst as a destructive scourge in North America in the year 1786, it had never been actually identified as occurring in Great Britain until July, 1886. The large number of widely separated localities, however, from which its ravages have now been reported, might lead one to the conclusion, either that it must have been established for some time previous to that date, and that it was only Miss Ormerod's energy and zeal which then brought its operations to light; or that some special circumstance has taken place during the past summer by which it has been distributed over the whole kingdom; or again, that some special climatic condition has allowed it to exist where it had failed to do so before. For several years Miss Ormerod has had an active and observant body of intelligent workers in all quarters of Great Britain, and it is strange, if it existed at all, that nothing has been heard previously of its operations. Nevertheless, on the other hand, from the large quantities of straw and

seed grain imported annually into the British Isles from countries known to be infested by this fly, together with the present rapid and easy methods of transport, it is at least extremely probable that it has been introduced over and over again, and it is difficult to understand why it has not long before now secured a firm foothold there. May it not be hoped that the law which applies with regard to many noxious weeds, will also be found to hold good in the case of this injurious insect? The existence of any plant as an aggressive weed in a given locality appears to be not so much a question of the introduction of the seed, as of the plant finding there the conditions suitable to its growth and healthy reproduction. There are many plants, for instance, troublesome weeds here, which must have been frequently introduced into Europe from this continent (or in some instances taken back again to the place whence we originally received them), but which have never yet taken forcible possession of cultivated ground, e. g., the common Purslane *(Portulaca oleracea)*, Hound's Tongue or Burrs *(Cynoglossum officinale)*, Small Burrs *(Echinospermum Lappula)*, and the common Foxtail grasses *(Setaria glauca* and *viridis)*; and then, although relatively they are far fewer, there are some which must have been frequently introduced on this continent, but which, except in a few localities, cannot (or do not) exist for more than two or three seasons, e.g., the common Scarlet Corn Poppy *(Papaver Rhœas)*, Scarlet Pimpernel *(Anagallis arvensis)*, common Groundsel *(Senecio vulgaris)*, Corn Gromwell *(Lithospermum arvense)*, and the common Nettles *(Urtica dioica* and *urens)*. In the same way there is no doubt whatever that the Colorado Potato Beetle *(Doryphora 10-lineata)* has been many times conveyed to the British Isles on transatlantic steamships, but not finding there conditions suitable to its requirements, it has failed to establish itself.

Miss Ormerod, quoting from Bulletin 4, U. S. Ent. Commission, tells us that "the original habitat of the Hessian Fly is considered most probably to have been Southern Europe and Western Asia, i. e., about the shores of the Mediterranean Sea," a district with a summer climate of far greater heat and aridity than is found in the British Isles. Again, in North America, where—whether introduced or indigenous matters not in this connection—this pest to our sorrow flourishes to a most remarkable degree, it has always dry, hot weather during the periods in which it passes through its active stages.

In view of the above facts, and notwithstanding that it has occurred in considerable numbers in many parts of Great Britain during the past

summer, I think it probable that its wide-spread appearance as an injurious insect was due either to some special cause which had not existed before, or to some unusual climatic condition, rather than to its having established itself in a new habitat suitable to its reproduction and increase. Furthermore, if the farmers can only be frightened sufficiently to induce them to obtain the pamphlet under consideration and to follow closely the advice which is there offered them, I cannot help thinking that before very long Miss Ormerod will be able to relegate the Hessian Fly to a place amongst the foes she has conquered.

James Fletcher, President Entom. Soc. of Ontario.

North American Lepidoptera: The Hawk Moths of North America, by A. Radcliffe Grote, A. M. Printed by Homeyer and Meyer, Bremen, 1886.

The above is the title of an interesting brochure by our old friend Prof. Grote, who has done so much to advance our knowledge of the North American moths. The press work is superb. For clearness of print, nice paper, and excellent taste in the selection of contrasting type for the heading of the sections, this work is a model.

After a graceful dedication to Prof. William Saunders, former editor of this journal, our author gives directions for collecting and preserving insects, followed by a chapter on the relation and habits of the *Sphingidæ*. He then takes up their classification. beginning with the sub-family *Macroglossinæ*, under which he includes the genera *Hemaris*, *Lepisesia*, *Thyreus*, *Enyo* and *Deidamia*. Then follow the sub-family *Chœrocampinæ*, including the genera *Everyx*, *Ampelophaga*, *Deilonche*, *Deilephila* and *Philampelus;* the sub-family *Smerinthinæ*, including the genera *Calasymbolus*, *Paonias*, *Cressonia* and *Triptogon;* and the sub-family *Sphinginæ*, including *Ceratomia*, *Daremma*, *Diludia*, *Dolba*, *Phlegethontius*, *Atreus*, *Ellema*, *Sphinx* and *Dilophonota*.

The reason for establishing the new genus *Deilonche* for *tersa*, is not very clear to me, nor do I feel so sure of the wisdom of establishing the new genus *Atreus* for the reception of *plebeius*. The fact is, that while studying the *Sphingidæ* of New England, I found more genera than I well knew what to do with, and perhaps I am on that account less disposed to look with favor on new genera. Our author says, "the type *(plebeius)* is, I think, not congeneric with the European *pinastri* (the

type of *Hyloicus)* nor can I find an Hubnerian genus for its reception. I should leave it in *Phlegethontius*, as Fernald seems to suggest, but it differs in the 12-veined primaries, etc." It is, perhaps, proper for me to say that in my studies of the venation of the *Sphingidæ*, I found that the species of this family, so far as I had material to study, had either eleven or twelve veins in the fore wings according to whether vein 10 was present or wanting. This vein arises from 9, near its outer end, and lies so close to it as to be easily overlooked. After denuding a long series, including many individuals of some of the species, I found that while the other veins were constant as to origin and termination, vein 10 is very variable and not to be relied upon, for in some examples it was present in one wing but absent in the other. It seems to differ as to the point of origin, sometimes arising from vein 9 at some distance from the border of the wing, at other times nearer the border, again close to the border, and again it was entirely wanting either in one wing or both; all in the same species. In my essay on the *Sphingidæ*, I stated that it was very doubtful if this vein would prove of any assistance in classification. I still hold to the opinion that this species will finally gravitate into the same genus as *celeus*. Finally the generic name *Atreus* is pre-occupied, having been used by Hoch in 1837 for a genus of Scorpions, and therefore cannot be used in this connection.

Cerisii is placed by itself in the subgenus *Copismerinthus*, and *geminatus* under the subgenus *Eusmerinthus*, with the variety *tripartitus* Gr., given for those individuals which have *three* blue spots on the black anal patch on the hind wing.

Prof. Grote divides the time of the work on our lepidoptera into three periods: The first including that of Abbot, Boisduval, the elder LeConte, Say, Peck, Harris, Gosse, Kirtland, and their historian, Dr. J. G. Morris. The second period, the one which he calls the "Renascence," is the period in which the American Lepidopterists catalogue the different families of the lepidoptera and thus lay the foundation for present and future discoveries. This period, which came to an end with the appearance of Grote's New Check List, "was a time during which a great deal of work was performed with good humor and at considerable self-sacrifice," and no one did his share of this work, which was more or less drudgery, more cheerfully than did Mr. Grote himself.

The author says that the writings of our entomologists have a flavoring of the localities from which they emanate, thus, "in some way the

scent of the Maine woods has got into Prof. Fernald's writings," and we may say in return that a vein of poetry runs all through this charming little work which we are now reviewing.

C. H. Fernald, Amherst, Mass.

CORRESPONDENCE.

THE GENUS QUADRINA.

Dear Sir,—Mr. Grote, in the current vol. of the Can. Ent., p. 40, takes exception to my note on this genus, and says my "remarks as to *Hemileuca* are uncalled for." The only thing I said in the note commented on by Mr. Grote, in regard to *Hemileuca*, was: "In Mr. Grote's Catalogue of 1882, *Quadrina diazoma* is placed in the '*Hemileucini*' and is associated with *Hemileuca*, *Hyperchiria* and *Coloradia*, which are all typical *Bombycids*." This is the fact, as a simple reference to the list will prove, and I cannot see in what manner the remark was uncalled for. I knew of all that Mr. Grote had written on the subject, and simply assumed, as I had a right to do, that Mr. Grote had changed his views as to the position of the genus, and that his latest view was expressed in the list. That the location was due to a printer's error I could not know. However, its position in the *Ceratocampidæ* is equally unnatural. As that group stands in Mr. Grote's list it is a perfectly natural and sharply limited one, all the members of which have in the male two branches to each side of each joint of the antennæ, which are moderately long, and the pectinations do not extend to the tip. In *Quadrina*, on the contrary, the joints are extremely short, the pectinations extend to the tip, and are very long; there is only a single branch to each side of each joint. If the specimen is a female, as Mr. Grote says, the antennal structure is unique and out of harmony with that of the other *Ceratocampidæ*. It would break up the group entirely to admit such a form in it But I believe the specimen to be a male. I do not find in my notes on the species any mention of the sex, but my recollection is that it was a male The species belongs most nearly where Mr. Grote first put it. I quote my own remark—"nearly related to *Gloveria*."

As to the *Hemileucini*, I have taken from it the genera *Hyperchiria* and *Coloradia* and placed them in the *Saturniidæ*, in a recent revision of that Group in the Proc. Nat. Mus., ix., pp. 414–437.

John B. Smith, Washington, D. C.

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THE EARLIEST BUTTERFLIES AT THE WHITE MOUNTAINS OF NEW HAMPSHIRE.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

A few years ago a visit was made to the Glen, in the White Mts. of New Hampshire, in the early spring, just as the first tender leafage was appearing (June 2–5), and a report of the thirteen butterflies then found was published in *Psyche*, 1874, vol. 1, p. 13–14, 18–19. Wishing to secure eggs from some of the wintering butterflies abundant in that place, which I then failed to secure from being too early, another visit was made last spring to the same place, and at the same date (June 3–7), as the season was evidently sufficiently advanced to make it practically at least a week later; and so it proved, the vegetation at the Half-way House, at the upper limit of forest growth on the Mt. Washington carriage road, being this spring exactly at the stage at which I found it in the valleys at the previous visit, the difference in elevation being over fifteen hundred feet. The sky was equally sunny in both cases.

The collecting ground was the same as previously, excepting that on this occasion there was superadded an ascent of Mt. Washington by Tuckerman's Ravine, with a descent by the carriage road; and also a walk southwardly from the Glen to North Conway.

This last walk showed a very distinct change in the fauna from the considerable clearing at the Glen to the open country to the south (a thousand feet lower), after the eight miles of unbroken forest, ending at Emery's, was passed. *Pamphila sassacus* at once appeared in considerable numbers; *Brenthis myrina*, *Phyciodes tharos* and *Atrytone hobomok* were far more common—all indicating an earlier appearance at this altitude, since they are common enough at the Glen in their season; while only two or three *Cyaniris pseudargiolus* were seen, in place of the abundance farther north, and not a single *Amblyscirtes samoset*, which had been seen sparingly at the Glen for several days.

The most interesting observation on the trip, however, was that of three individuals of *Oeneis semidea* on the mountain summit. There is indeed a possibility of error here, for no one of them was taken, though two were near enough to warrant a dash with the net. They appeared to be unusually dark, but they had every other appearance of this butterfly, including size and their manner of flight, when flying tolerably high on a not windy day. As the caterpillars have been taken fully grown and wandering in September, it is altogether probable that they pass the winter (as has always been supposed) in chrysalis; and if so, there seems to be no reason why they may not emerge as early as this; but as the butterfly has never before been found on the wing earlier than July,* and is never known to be abundant before the second week in that month, and disappears by the middle of August, it would seem not impossible and even probable that the butterfly is double-brooded, at least in part. This certainly seems strange at such an inclement altitude, especially as the European *Oeneis aello* (which winters, at least sometimes, like many other Satyrids, as a juvenile caterpillar) is believed to take two years to reach maturity.

The only other butterflies seen above the timber were *Eurymus philodice*, twice near the summit and once in Tuckerman's Ravine; and *Lycaena americana*, seen once a mile or two down from the summit. A single *Cyaniris pseudargiolus lucia* was seen near the edge of the forest just before entering Tuckerman's Ravine.

It may be added that the snow patches about the summit of Mt. Washington, which were not very extensive—their size, as seen from the valley, diminishing perceptibly in the few days of our visit—were peppered with minute insects, largely made up of a few species; the most abundant were an Aphis, two or three flies no larger than Aphides, some other minute Homoptera, one or two minute Hymenoptera and equally small Coleoptera. Among larger forms were a species of the heteropterous genus *Acanthosoma*, according to Mr. Uhler, probably *A. nebulosa*, which was the most common of all, and *Bibio femoratus* Wied. (determined by Dr. Williston); every pool of melted snow contained three or four of the latter, while the former fairly swarmed everywhere.

As to the valley butterflies, the advanced season was as apparent with

* Harris, however, on the authority of Oakes, gives June as one of the months of its flight.

them as with the vegetation, as will be seen by the following serial notes, as well as by the much longer list. Twenty species in all were seen, fourteen of them not seen on the previous visit, while, more remarkable than that, seven of the thirteen species before seen were not now observed.

Basilarchia arthemis, found previously in abundance as a larva just out of hibernaculum, and *B. disippe*, sparingly in the same condition, were not discovered at all. Hundreds or perhaps thousands of the shoots of black birch were examined, as well as many poplars and willows in suitable spots, without a trace of anything—not even of a leaf eaten in Basilarchian fashion.

A single specimen of *Polygonia interrogationis umbrosa* was seen on the 7th, on the Notch road south of Emery's.

Polygonia faunus was taken or seen every day but the 3rd, on forest roads; perhaps two or three dozen in all were taken, and about a third of them were females. None were seen beyond Emery's, and none in walking from Gorham to the Glen, the latter on a somewhat cloudy afternoon.

P. gracilis was not met with. One butterfly was seen two miles up the Mt. Washington carriage road, which looked very like *P. comma*, but was perhaps *P. faunus*. None of the females would lay eggs on young willows, in their two or three days confinement in the Glen, nor on larger plants in Cambridge after my return home.

Polygonia progne and *Nymphalis j-album* were not seen this year.

Two specimens of *Papilio antiopa* were seen, on the 4th and on the 7th.

No *Aglais milberti* was observed on this occasion.

Two fresh specimens of *Argynnis atlantis* were seen on the 7th, one in the forest a short distance north of Emery's, the other half way from there to Jackson.

Fresh specimens of *Brenthis myrina* were seen every day after the first (and either this or the next species on that day), and all taken were males. The number increased from two on the 4th to three or four times that number on the 7th, before reaching Emery's, and after that as many more, though it was then after 3 o'clock.

Unless the specimen seen the first day was *Brenthis bellona*, this species was only seen on the 5th, in a few examples, in which both sexes were represented, and all were more or less worn.

Phyciodes batesii was seen on the 7th, and of each sex, three or

four on the forest road south of the Glen, and abundantly beyond Emery's.

The larvæ of *Cinclidia harrisii* were found feeding on *Diplopappus*, in the penultimate and final stages, in a dozen different localities in the Glen. They were apparently just about as forward as they were on the previous visit, only then they were found at Gorham, which, though farther to the north, is 800 feet lower than the Glen, and in a broader, more open valley, where the spring opens slightly earlier than at the Glen. The caterpillars taken this year went into chrysalis between June 7 and 13, and emerged June 21–27.

Though half a hundred plants of *Loricera* by the roadside were searched for *Euphydryas phaeton*, this species was not found as on the previous occasion, nor did any of the plants appear to have been eaten.

During the first half of our stay, *Cyaniris pseudargiolus lucia* was the most abundant butterfly, and though afterwards it did not diminish, it was supplanted by the increasing numbers of the next species. Yet when most abundant its numbers by no means equalled those at my former visit, and at no time were more than five or six seen at once. On the last day, south of Emery's only a couple of specimens were seen, so that the first brood was disappearing; all were of the form *lucia* or heavily marked *violacea*. Females were enclosed over *Amelanchier*, *Vaccinium* and *Cornus*, and laid abundantly on the first two, but not on the last. When the larvæ emerged, however, they would not touch either *Amelanchier* or *Vaccinium*.

In the last half of our visit *Lycaena americana* was the commonest butterfly. It was the first seen in the morning, the last in the afternoon, and appeared everywhere excepting in Tuckerman's Ravine and above timber on Mt. Washington, though seen once on the latter. Not a specimen was seen on my previous visit.

Three specimens of *Feniseca tarquinius* were taken, and others were seen; one of the two females taken, old and battered, was left three days enclosed over a branch of *Alnus*, on which were numerous young and fat *Coccidæ* (none with Aphides were discoverable), but no eggs were laid; the other taken the last day, died on the way home, with numerous eggs in her abdomen.

Eurymus philodice was tolerably common every day, and increasingly so. On my previous spring visit none were seen. Two specimens were seen in the alpine zone of Mt. Washington, and one in Tuckerman's

Ravine—the only butterfly seen there; both had probably flown in from below.

A few fresh specimens of *Pieris rapæ* were seen every day but the first; most on the last day, below Emery's.

Six or eight specimens of *P. oleracea* were seen, all very fresh; of the three or four taken only one was a female.

Though *Euphœades turnus* was seen every day in very fresh condition, it was not yet abundant; four, however, were seen at one roadside puddle, and all were exceedingly tame.

Several fresh specimens of *Thanaos icelus* were seen the first day and the numbers increased daily, both sexes fresh, but the female predominating. Several females were enclosed on different species of poplar and willow, but laid no eggs.

Two male specimens of *Cyclopides mandan* were taken by the roadside on the 5th, and one or two were seen north of Emery's on the 7th.

Males and females of *Amblyscirtes vialis* were seen every day, but never more than three or four specimens a day. Enclosed females laid eggs on grass on June 5–6, which began to hatch on June 14; the first one to change stopped eating on July 18 or 19, and in about ten days changed to chrysalis. The species has never before been reported from this region.

A couple of specimens of *Amblyscirtes samoset* were seen, and one of them taken on the 7th, north of Emery's.

The first *Atrytone hobomok* was seen on the 7th, in the Glen, another between that and Emery's; but south of that at least a dozen specimens, all of them males.

Pamphila sassacus first appeared at Emery's, south of which it was twice as abundant as the last species; a couple of females were taken, but nearly all the others seen were males. It was evidently going to be very abundant.

SYNONYMY IN AMERICAN COLEOPTEROLOGY.

BY JOHN HAMILTON, M. D., ALLEGHENY, PA.

On looking over Melsheimer's, Crotch's and Henshaw's Catalogues of the described species of North American Coleoptera, many names will be seen placed as synonymical, or varietal; while a reference to the bibliography of the many synopses and monographs of families and gen-

era in the Trans. Am. Ent. Soc., and other publications, exhibits a number still larger. How were so many originated? and, Have they any value? are questions that it may not be unprofitable to briefly consider. As to their origin, it may be asked: Are they descriptions of the same forms made by different writers in ignorance of what had previously been done? or, of forms that at the time were regarded as distinct, but afterwards, by connecting links, seen to be but variations within specific limits? or, from mistaken identification and other causes? The history of American Coleopterology shows all these to have been factors in varying quantities. Before the year 1824, no description of any species (so far as known) had been published on this side of the Atlantic; but, for more than one hundred years previously, large numbers had from time to time been taken over and described in every country of Europe, many of them several times by as many names. The works of these various describers were mostly unknown or inaccessible to American students of that period, so that when Mr. Thomas Say, the founder of this branch of Entomology here, undertook the description of our species at the year mentioned, it was often impossible for him to know what had been done abroad. Haldeman, Melsheimer and others thus continued the work till 1844, they and the Europeans making synonyms reciprocally, in ignorance of what each had done. About this time appeared a talented, scholarly, enthusiastic young man, who, on seeing so many of "our finest insects going to Europe for names," with Juvenal exclaimed, "*Siccum jecur ardeat ira*," and forthwith the immortal Leconte devoted his life (as he informs us) "to the classification and naming of American Coleoptera, even at the risk of creating much synonymy." How well he did his work needs not to be told to the Coleopterological world of either hemisphere. The synonymy made proves to be much below what might have been reasonably anticipated. Mr. S. Henshaw in his Index gives, to that time, the number of species named by Dr. Leconte as 4,734, to which is to be added 80 published posthumously—in all, 4,814. Of these only 864 were considered synonyms, and 188 as races or varieties. This kind of synonymy may be termed re-descriptive, and with proper care and a judicious restraint on haste, but little of it should be made with us hereafter.

A second source of synonymy arose from the descriptions of certain forms as distinct, that differed so much from the assumed type—perhaps in size, ornamentation, or even structure—as to seem different, but subse-

quently discovered to be merely variations of one thing; just as one ignorant of the variations of *Canis familiaris* might describe a poodle, a Newfoundland, a bull-dog, etc., etc., as true species of *Canis*. In the early times of description this was unavoidable, as the extremes of many of the variable species look so unlike that it could not be known they were the same till it was proved by more extensive collections and after discoveries. In his lifetime Dr. Leconte eliminated many of the ones made by himself and others, and Dr. Horn, in his studies, with enlarged collections and more abundant opportunities, adds to this, and in suppressing species sometimes carries the matter too far to please collectors, but doubtless no further than is warranted by well ascertained specific variation.

There is another source of synonymy that practically does not differ from the last, except in this, that it is made intentionally by writers who are a little mixed, or have a different conception of what constitutes a species from that entertained by our leading Entomologists, and the authors of our lists of Coleoptera.

And here it becomes necessary to say something about species. No definition of this term as applied to organisms has ever been received as entirely satisfactory, and a discussion of it here is foreign to the object of this paper. For practical purposes it was necessary for naturalists to have a definition of universal applicability, and that of Buffon has generally been accepted by most of the leading Zoologists and Botanists since his time, namely: "A species is a constant succession of individuals similar to and capable of reproducing each other." The believer in special creation, the evolutionist, and such as hold opinions between these extremes, can meet here on common ground. Coleopterists on this side of the Atlantic mostly agree with it in substance, giving it expression in this form: "A species is an aggregation of variable individuals which have a common parentage." With this definition, except in case of uniques, obviously it would be unscientific to make any individual a type. This is the line to which systematists are endeavoring to bring our species, and the further it is pursued, we find typical superseded by normal descriptions which embrace the points of agreement of as many individuals as can be examined, and reject the points of disagreement, as individual or racial.

The synonymy thus made has not been very extensive, but threatens to become so through the writings of Mr. Thos. L. Casey, who, for the

short time since the issue of his first paper, proves to be a very industrious and prolific author. He does not seem to have accepted the above definition, or at least to a great extent ignores it in practice, but the idea he attaches to the term species is only known by inference. He writes, Bul. No. 6, Calif. Acad. Sci., p. 162: "Forms which some Coleopterists would regard as specific, are held by others to be simply racial, and by others again as merely accidental variations not even worthy of a name." That he entertains the first of these opinions seems to be a correct inference, from the fact he has described as valid among the larger species a considerable number of forms which others consider as variations. Now, it can scarcely be supposed that he did not know, in common with others, the common parentage of many of these; and, if so, then he does not fully recognize this relation as essential in the construction of species. In other words, he founds his species on identity of structure, thus making them practically artificial, like genera. This brings him into direct conflict with those who regard common parentage as an essential element in species, and as they happen to be in the majority and control our catalogues, many of his species are placed in synonymy at once. Mr. Casey, among our Coleopterists, seems to stand alone in his views, but Lepidopterists for a long time appear to have had a somewhat similar split.

These two views are diametrically opposite. The first recognizes no single individual as a type when others are at hand, and raises an insuperable barrier to the multiplication of species. The second describes more or less minutely any individual, and calls it the type of a species, but never defines how far it is allowable for other individuals to vary and still belong to that particular species, and so can offer no defense against their multiplication *ad libitum*.

The re-description by Americans of our Coleoptera that were first described in Europe, has been and still is of inestimable value, and it would have been no loss had every species of ours described there been re-described here and placed in synonymy.

The original descriptions were often largely defective and so indefinite that to make a determination with certainty was impossible, even when they were accessible. The American descriptions in the synonymy are much clearer, and from them, with a little practice, except in minute or closely related species, the insect may be readily known; and in fact, for many species are the only accessible or intelligible descriptions we yet have. As no two writers present the same thing in the same way, by

synonymy many doubts may be solved that could not be by a single description.

The second kind of synonymy, which may be regarded to a certain extent as embracing the third, is likewise more or less useful, when fully established. The names represent, within specific limits, variations more or less divergent. These differences may be of a trivial character—of the kind Dr. Leconte excuses himself for making in early life, on the ground that, like most young Entomologists, he had magnified characters as of importance that were merely individual or of no importance; still a reference to even such may give points of information not likely to be so lucidly set forth in the normal description of the species. Or, again, these names may represent the extremes, or even the sexes of a variable species that in ignorance of their true relationship have been described as true species. This is the most valuable part of synonymy, because when a species is treated as a whole, the peculiarities of individuals and races are usually less clearly stated than when specialized.

A catalogue of our described Coleoptera with the established synonymy would be exceedingly valuable to all our students of Coleoptera. It is a desideratum.

It was intended to have closed this paper here, but the occurrence of *Carpophilus hemipterus* Linn., affords an opportunity to present a practical illustration in reference to some of the foregoing statements. This species is potentially cosmopolite, having been carried to many countries by commerce, and in Europe has many synonyms. The present colony, consisting of several hundred individuals, was found in a box of raisins recently from Spain. It is a good example of the great variableness in structure and coloration that may occur among the individuals of a species, as is well pointed out by Mr. A. Murray, in his Monograph, p, 363: "For example," he says, "the following variations occur in the form. with intermediate degrees of each, viz:

"1.—The posterior angles of the thorax nearly right angles.

"2.—The posterior angles of the thorax nearly rounded.

"3.—The posterior angles of the thorax nearly cut off.

"In color, again, it varies as much, the variation, however, being referable to greater or less intensity of coloring." I was able to verify Mr. Murray's statements in every particular from this single colony. This is a good demonstration of the impropriety of making any individual the type of a species, as well as of disregarding common parentage as an essential element in the construction of species.

STRAY NOTES ON MYRMELEONIDÆ.

BY DR. H. A. HAGEN, CAMBRIDGE, MASS.

(Continued from page 93.)

5. *Palpares papilionoides* Klug.

I have never seen this species, except the couple from Arabia Felix in the Berlin Museum, described by Klug, Symb. Phys., iv., pl. 35, f. 2 and 3. Rambur, p. 369, No. 5, described the species after Klug's figures. Rambur and others, not excepting myself, believed that the male did not belong to the same species as the female. Klug calls it a variety. After a thorough study of the species in Berlin, I arrived at the conclusion that Klug was right, and *P. cephalotes* Klug shows a similar but not so exaggerated difference between both sexes. I have carefully compared the types with the figures, and found them to be very exact. Indeed, Mr. Weber was one of the best draughtsmen in Germany. *P. papilionoides* had nothing whatsoever to do with *P. aeschnoides*, as McLachlan supposes. The types of both species are in the Berlin Museum.

6. *Palpares immensus*, McLachl.

The species is described, 1867, Journ. Linn. Soc., ix., p. 239. I have to state that the excellent description leaves no doubt that my *P. comes* noted without description, 1866, p. 456, is the same species. My specimen is a female from the Nagami Lake, presented by Prof. Boheman. Length of body 66 m.m.; exp. alar. 160 m.m.

I am glad that my manuscript name is explained; at the same time I ask to cancel also *P. conspersus* Hag., l. c. p. 456, from Nagami Lake, by Boheman, as the type has been destroyed; there will be specimens in the Stockholm Museum.

7. *Palpares Caffer*, Burm.

This species is mentioned, Burm., ii., p. 998, No. 23, with *P. speciosus* L., as follows: "A very similar but larger species, with the gray spots of the front wings very small, from south-east Africa, was received from the collection of Mr. Drége. I name it *M. Caffer*. The abdomen of both sexes shows the same difference (as *M. speciosus*)." I have before me two females, one from Dr. Schneider's coll., the other coll. by Dr. Wahlberg in Caffraria, from the Stockholm Museum. The British Museum has four

specimens among Walker's types of *M. speciosus.* Finally I have seen the types of Burmeister in the Halle Museum. The species is mentioned by McLachlan in his review of Walker's paper; as far as I know, it has never been described. Fem., length of body, 50 m. m.; exp. al. 120 to 130 m.m. As I have no males before me, I give briefly the characters to recognise the females: The front margin of prothorax notched in middle; with two transversal rolls, one before the front margin, the other before the hind margin; between them a flat, narrow, deepened saddle, perhaps eight times broader than long; a longitudinal black median band is only a little enlarged on the saddle. *P. speciosus* has the front margin straight; the black median band fills the saddle on each side nearly to the side margin; the band is on the front roll triangularly dilated, but is wanting on the hind roll. This character is very good to separate directly both species. *P. Caffer* has the wings broader, more obtuse on tip, less spotted; front wings saffrony, with smaller ashy gray spots; there are much less numerous little spots around hind margin, and nearly none on the disk; ante-cubitals with black linear bands; pterostigma straw color; hind wings paler, about hyaline, the brown bands less large, not connected, the penultimate sometimes divided; abdomen brown, darker below.

The description of the appendages of the male is needed.

I have two females from Pniel Station, Damaraland, which I had named *P. sparsus.* As this name is now pre-occupied by a similar, perhaps the same species, from Damara, by McLachlan, I refrain from giving a description. It is intermediate between *P. speciosus* and *P. Caffer*, but the black band of the prothorax is as on *P. Caffer.*

8. *Palpares pardalinus* Burm.

Burmeister, Vol. ii., p. 997, No. 20, describes the male from Orange River, South Africa, collected by Drége. In 1849 I bought the second specimen from Drége's collection, also a male, which I have compared with Burmeister's type still present in the Halle Museum. *Myrmeleon pardalinus* Walk., p. 314, No. 26, a female from the Cape, is the same species. This was doubted by McLachlan, Journ. Linn Soc., p. 275, and for the species the name *P. brachypterus* proposed. Rambur's species is different. In 1850, in Peters' Voyage, p. 101, I had placed *P. pardalinus* together with the species of Pamexis. But I have corrected this in Stett. Zeit., 1860, p. 361, and 1866, p. 457.

9. *Pamexis contaminatus* Burm.

McLachlan (Review Myrmel. de Rambur) notes for this species that there exists an error in my Synopsis, as the *M. contaminatus* Burm. is a North American species. But he has overlooked that in my Synopsis, p. 433, is quoted *M. contaminatus* Burm., a species only named Vol. ii., p. 995, but the differences stated from *M. irroratus* from S. Carolina. This species belongs to Macronemurus, Synopsis, p. 424. The type is before me. Besides, Synops., p. 433, quotes *M. contaminatus* Burm., *coll. Winthem*, said to be *Pamexis contaminatus;* Synops., p. 457, it is quoted with this name and the locality, Orange River. In the introduction of the Synopsis, p. 370, is stated: "Sometimes collection-names of undescribed species are quoted, soon to be published, or for another reason." The publication was prevented by my going to America a few months later. The species, of which the type with the name in Burmeister's hand-writing is before me, belongs to a genus so far distant from the N. American species, that it seemed to be not inconvenient to retain Burmeister's name, though he had in his publication not even mentioned it, as is stated by the words [from Winthem's collection]. Now *Pamexis contaminatus* is from the collection of Drége, and as his insects were sold to many museums and collections, I believed that Burmeister's name would be found in other collections, and did retain it for this reason. *Pamexis contaminatus* is identical with the type of Rambur's *P. pardalinus*. This identity was only recognized by my study of the type after the publication of my Synopsis, in which *P. pardalinus* Rbr. is quoted with *P. pardalinus* Br. As the description of Rambur is sufficient, and the identity with Burmeister's species is beyond doubt, I believe that the name *P. contaminatus* can be accepted, instead of coining a new name for it, and therefore I propose to name it *P. contaminatus*.

10. *Pamexis luteus* Thunbg.

The figure and the description of this species (perhaps the type is still in existence, but since it was nearly fifty years ago that I saw Thunberg's collection, I would not state more) belong to *M. venosus* Burm., which after a careful study subsequent to the publication of my Synopsis, I find is identical with *M. conspurcatus* Burm.; both types in the Winthem collection. Rambur's species, after the study of the type, I find is the same with *M. venosus* Burm.

NOTE ON ABBOT'S SPECIES IN THE BREMEN MUSEUM.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

In the Bremen Museum are specimens collected by Norwich in the Southern States in the beginning of the century, which bear evidence of having been determined by Abbot, as there are one or two MS. names credited to him. I note here merely a ♀ specimen of *Parorgyia leucophæa;* this is paler, the outer line followed by brown shadings, as compared with our Northern *Clintonii*, and agrees with a specimen collected by myself in Alabama, and previously described in CAN. ENT. There is then no doubt that our Northern *Clintonii* is a valid species. There is also a specimen of *Catocala neogama.* This bears out my statement that *neogama* is distinct from our Northern *communis* Grote (= *neogama* Guen. nec Abbot). The hind wings are lighter yellow as figured by Abbot, while our Northern *communis* has them of a dusky ochrey yellow, and there are a number of other comparative characters whereby the two may be separated. I should then be disposed to consider all determinations of our Northern species as *neogama* to be incorrect. I may take occasion later on to allude to other species from the Southern States in the Bremen Collection.

NOTE ON MISTAKEN IDENTIFICATIONS.

BY A. R. GROTE, A. M.

In the course of my studies I have been able to point out a number of cases in which the species illustrated by earlier authors have been identified with allied forms inhabiting the Middle and Eastern States and parts of Canada, I must think wrongly. Dr. Harris has furnished a number of instances in point, chiefly, perhaps, in interpreting the figures of Abbot. It must not be forgotten that the locality has much to do with the forms of Lepidoptera. The different climate and physical conditions of the Southern States could not fail to impress the Lepidopterous fauna of that region. The topography of the country, the climate, as, indeed, I say on page 215 of the CAN. ENT. for 1886, must be duly considered in this question of related forms. In his writings Dr. Harris describes our Northern *Phlegethontius celeus*, for the more Southern species *carolina.*

He identifies our *Philampelus pandorus* with the species *satellitia*, which seems to be South American, and not to occur within the limits of the United States, or, as we write, North America. Equally in the smaller moths he wrongly identifies his *(Parorgyia) achatina*, which is not Abbot's species, but our northern *Clintonii*. In the *Noctuidæ* his identification of his *Apatela americana* with either of the forms figured by Abbot is, at least, probably premature. Abbot's drawings, which I have studied as closely as possible, make it probable that there are two Southern species of *Parorgyia*, *leucophæa* and *achatina*, not found in the North, and I believe I have correctly identified the former in two female specimens, one of which I found in Alabama.

While writing, I am reminded of another curious identification of Dr. Harris's in the *Coleoptera*. He says, House Report, April, 1838, p. 72: "In France, a large insect, called *vinaigrier* (CARABUS *auratus* L.), devours the female *Melolontha vulgaris* at the moment when she is about to deposit her eggs. I have taken one specimen of this fine *Carabus* in Massachusetts." No other author I have seen refers to this identification of an American species with the European *C. auratus*.

Abbot's work must be studied in connection with Southern collections, and his observations be verified in all stages, before we can be quite sure in all instances that we have his species before us. That he sometimes "mixes" his species is, I have thought, proved by his plate of *Catocala amasia*, where he gives us different species for sexes of the same; and this may not be the only instance. Among Abbot's smaller moths, I have at least identified correctly his *(Adita) chionanthi*, a Noctuid sparingly found in New York State, but which is so plainly marked that the identification can be relied upon.

Leaving Dr. Harris and coming to Guenèe, there is no doubt now (after freshly comparing Southern specimens) that this eminent writer wrongly identified our Northern species *Catocala communis* Grote, with Abbot's *neogama*. The typical form of *communis* as it occurs with us has the primaries of an obscure smooth olivaceous gray with distinctly *brown* markings; the hind wings dusty ochrey or brownish yellow. *C. neogama* has the fore wings black shaded over paler, purer gray with bright yellow secondaries. While the two are of a similar size, there seem also certain differences in the band of the hind wings. As I originally pointed out. Guenèe also mistakes Abbot's *vidua*. It seems to me probable, however, that the *vidua* of Guenèe, or *viduata*, which I have called *Catocala*

Guenèi (to avoid all further confusion and because Guenèe's alteration is unessential and merely covers a wrong identification) has been sent to Europe as *vidua* of Abbot, either by Abbot or determined as after Abbot by collectors in the Southern States at the commencement of the century (1800). Abbot, I have said, figures probably what Guenèe calls *desperata*. But it is not essential to recover now this name of Abbot's. It was applied at a time when black winged Catocalæ were a great rarity and when the number of species now known was not guessed at. When we know all the Southern forms *ab ovo*, then it is time enough to be certain what Abbot meant by *vidua*. If my supposition that thereby he intended our *desperata* turn out correct, later lepidopterists may make the change, I call our Northern species *desperata* Guen., and Guenèe's *vidua*, which I have proved not to be Abbot's and have certainly identified, GUENEI.

HINTS ON COLLECTING HYMENOPTERA.

BY W. HAGUE HARRINGTON, OTTAWA.

To have the specimens in a collection look well, and at the same time be in a condition such as to render their examination as easy as possible, it is necessary that they should be properly collected. The ordinary cyanide bottles prepared either with plaster of Paris, or sawdust, which are used for Lepidoptera and Coleoptera, do not furnish good specimens of Hymenoptera, and those collected in alcohol are less satisfactory. I have found the method advised by Dr. Williston (Psyche, vol. iv., p. 130) for collecting Diptera, so satisfactory that I will quote a portion of his description :—

"I select several two-ounce, wide-mouthed bottles of the same form, and carefully line the bottom and sides with a good quality of blotting paper. Good firm corks are selected, which are interchangeable in the different bottles; in one of these corks a small hole is made, in which it is better to fit a small metallic ferule; a strip of blotting paper is then coiled within this cavity, and it is over this that a few drops of a solution of cyanide of potash is poured."

For those who may not desire to keep on hand a solution of this poison, I would suggest a modification of this method which I find very

satisfactory. Scrape a few grains of cyanide into the cavity in the cork and then insert a small wad of damp cotton wool or sponge. The fumes will be readily given off, and it is only necessary to occasionally renew the cyanide. As Dr. Williston suggests, it is well to have several bottles, but it is sometimes impossible for the collector to take more than the minimum amount of apparatus, and he will then limit himself to two, reserving one of them for delicate or small insects. Bees should never be placed in a bottle with previous captures, as honey is often disgorged, and the specimens greatly injured by the matting of pubescence and soiling of the wings; the pollen which the bees so generally carry is almost as bad in its effects. The safest and most desirable plan is for the collector to carry a supply of small pasteboard pill boxes, and transfer his specimens frequently to these, putting only one specimen of such insects as Bombus in a box. These boxes can be obtained of very small sizes, permitting a sufficient number to be packed in a small space. Their use ensures perfect specimens and enables the collector to keep a better record of them by numbering the boxes, and in his field note-book entering full particulars of the contents of each. When possible, it is better to pin the insects before they stiffen, but if time or circumstances do not permit of this, they will keep safely in the boxes, and may be at any time easily relaxed in a damp atmosphere, care being taken not to allow them to become wet. In pinning it is not at all necessary to set the wings and feet symmetrically, unless one has plenty of time and desires pretty specimens. The wings, however, should be separated, so as to admit of a full examination of the venation both of the anterior and posterior ones, and of the metathorax and the basal segments of the abdomen.

BOOK NOTICES.

It is a cheering sign of the zeal and energy and ability that are being brought to bear upon Entomology that there should be so rapid an increase in the literature of this department of Natural Science. Though several works of importance have been recently noticed in these pages, there are still many others which we desire to acknowledge, and to bring before the notice of our readers. This, however, we can do but briefly, as so much space has of late been given up to literary notices.

The first work on our list is :—

THE BUTTERFLIES OF NORTH AMERICA. By W. H. Edwards. Third Series, Part II., 4to. Houghton, Mifflin & Co., Boston, Mass.

The second part of the new series of this superb work contains the usual three exquisitely finished coloured plates of butterflies. The first illustrates the Californian *Colias Harfordii* Hy. Edwards, and its variety *Barbara*, giving no less than nine pictures of the imagines, and more than a dozen of the earlier stages ; the second *Argynnis Coronis* Behr., giving both the upper and under surfaces of the male and female of this beautiful Californian species, which extends northward as far as our own North-west Territory, where it has been taken by Capt. Gamble Geddes ; the third plate fully illustrates all the stages of *Neonympha Gemma* Hubn. and *N. Henshawi* Edw. There is the usual letter-press description of all the species figured, and also a notice of *Argynnis Callippe* Boisd. It is hardly necessary to add that no Lepidopterist's library can be considered complete without a copy of this admirable work.

REPORT OF OBSERVATIONS OF INJURIOUS INSECTS and Common Farm Pests during the year 1886, with Methods of Prevention and Remedy. By Eleanor A. Ormerod, 8vo., 112 pages. London : Simpkin, Marshall & Co.

We must congratulate our esteemed friend upon the publication of her Tenth Report. It is full of interesting matter and well illustrated with excellent wood-cuts, chiefly the work of the talented authoress. The principal noxious insects treated of are "Earwigs" affecting cabbage—a pest that we are happily free from in this country ; Clover Weevils, the Hessian Fly and other wheat insects, the Hop Aphis, Mustard Beetles, the Horse and Ox Warble-flies, etc. Economic Entomologists everywhere may learn much from these pages ; though the insects treated of are for the most part British, many of them have been transported to this side of the Atlantic and to other distant regions, where they have wrought incalculable damage to crops of various kinds.

SYNOPSIS OF THE HYMENOPTERA OF AMERICA, NORTH OF MEXICO. By E. T. Cresson. Part i. Families and Genera. 8vo., 154 pages.

This valuable work, published as a supplementary volume by the American Entomological Society in Philadelphia, is a very much needed contribution to the literature of this difficult order of insects. With this

assistance towards classification, we trust that many will be encouraged to collect and study these particularly interesting creatures.

TRANSACTIONS OF THE AMERICAN ENTOMOLOGICAL SOCIETY, and Proceedings of the Entomological Section of the Academy of Natural Sciences. Philadelphia. Vol. xiii., 1886.

This volume is replete, as usual, with papers of high scientific value by such well-known authorities as Dr. Horn on Coleoptera, Messrs. Ashmead, Blake and Howard on Hymenoptera, the Rev. Messrs. Holland and Hulst on Lepidoptera, and Mr. Williston on Diptera.

THE MULBERRY SILK-WORM; being a Manual of Instructions in Silk Culture. By Prof. C. V. Riley. Bulletin No. 9. Division of Entomology, U. S. Department of Agriculture.

OUR SHADE TREES AND THEIR INSECT DEFOLIATORS; being a consideration of the four most injurious species which affect the trees of the Capital; with means of destroying them. By Prof. C. V. Riley. Bulletin No. 10.

The species referred to are the Elm-leaf Beetle (*Galerucha xanthomelæna* Schrank.); the Bag Worm (*Thyridopteryx ephemeræformis* Haw.); the White-marked Tussock-moth (*Orygia leucostigma* Sm. & Abbot); and the Fall Web-worm (*Hyphantria cunea* Drury).

REPORTS OF EXPERIMENTS WITH VARIOUS INSECTICIDE SUBSTANCES, chiefly upon insects affecting garden crops, made under the direction of the Entomologist. Bulletin No. 11.

MISCELLANEOUS NOTES ON THE WORK OF THE DIVISION OF ENTOMOLOGY for the season of 1885. Prepared by the Entomologist. Bulletin No. 12.

These four works abundantly testify to the value of the Government Commission on Entomology at Washington, and to the ability and industry of its members.

ARSENICAL POISONS FOR THE CODLING MOTH (*Carpocapsa pomonella* L.) By Dr. S. A. Forbes, State Entomologist of Illinois. Bulletin No. 1.

Another valuable contribution to Economic Entomology, the result of careful and painstaking work in the field.

CORRESPONDENCE.

USE OF CHLOROFORM IN COLLECTING.

Dear Sir,—In the article of Henry S. Saunders, on Collecting at the Electric Light (CAN. ENT., Feb., 1887), he gives his experience in the use of cyanide of potassium and chloroform as follows: "Cyanide of potassium I found the best poison; a few drops of chloroform on cotton would quiet them more quickly, but was more troublesome, the chloroform having to be frequently renewed, occasionally as often as four or five times during the same evening, and sometimes even then the moths would be found alive the next morning."

I should like to explain my method of collecting with chloroform. I have found it better than any other, whether at the electric light or in the field:

Take a glass fruit jar, one in which the lid screws down upon a rubber cushion or packing. Put a bunch of cotton in the bottom, retaining it in its place by pressing down upon it a circular piece of pasteboard, made to fit tightly in the jar, except that two or three notches should be left in the edge for the chloroform to run through to the cotton. Saturate the cotton with chloroform and screw the lid down tight. The bottle is now ready for use, and it will be found that an insect dropped into it will be suffocated almost instantly by the fumes of chloroform that completely fill the bottle. A feeble flutter for a second, a kick or two, and all is over. As soon as the insect is dropped into the bottle, screw the lid down again, and as it fits air tight, the chloroform will not evaporate too rapidly. Less than a teaspoonful will last for a whole evening's work. If on retiring from the work the chloroform seems nearly exhausted, it would be well to pour in a few drops more, and then close the lid for the night. If these precautions are taken the insects will never revive.

Chloroform, when used in this manner, will be found to possess many advantages over any other poison. It is quicker in its action, much more convenient, and under all circumstances entirely harmless. I use this form of collecting bottle both for the electric light and in the field. The bottle will contain, without injury to the specimens, the captures of a whole evening, or a whole day.

If, through carelessness, so much chloroform has been poured into

the bottle as to saturate the pasteboard on which the specimens rest, their wings may become moistened and somewhat damaged. To prevent accidents of this character, pack a bunch of crumpled newspaper tightly down on the pasteboard before putting in any specimens; the paper will be dry, and will prevent the insects from coming in contact with the moist pasteboard.

For Coleoptera I use a morphine bottle prepared in the same way, except that the newspaper is not wanted, and it is closed with a cork. I always carry such a bottle in my pocket ready primed, and thus am always prepared for preserving any specimens captured incidentally while engaged in other affairs.

J. A. Jackson, Des Moines, Iowa.

FOSSIL BUTTERFLY FOR SALE.

In order to illustrate more fully his forthcoming work on New England Butterflies, the undersigned offers for sale for Two Hundred and Fifty Dollars, that wonderfully preserved Fossil Butterfly, *Prodryas Persephone*,

of Colorado. The accompanying cut gives a rude impression of it. Less than twenty specimens of fossil butterflies are known in the world, and this is by far the most perfect and best preserved.

Samuel H. Scudder.

Cambridge, May 9, 1887. [adv.]

The Canadian Entomologist.

VOL. XIX. LONDON, JULY, 1887. No. 7

ABOUT NAMES.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

I have read, as all of us have, the review of a book by C. J. Maynard, on our Butterflies, by Mr. W. H. Edwards, and which appeared in the February number of the CANADIAN ENTOMOLOGIST. Whatever Mr. Edwards writes is trenchant and to the point, so that we have received the impression that Mr. Maynard's book is really not what it ought to be, is not up to current scientific knowledge, and is inferior in its illustrations. There is no more to be said about the book on this head; its publication will probably do very little real good, except perhaps that here and there a reader into whose hands it may chance to fall may have his interest excited in the subject, and so be led to buy a better one, as, for instance, that of Prof. French, to say nothing of Mr. Edwards's splendid volumes. But I was interested in Mr. Edwards's remarks about the names of butterflies, in which the critic leaves his prey to "regret to say that Mr. Scudder is our greatest sinner in this respect" (p. 39). Mr. Scudder, who never defends himself, might well need a champion as far as I understand the average opinion of students. I am all unworthy to assume such a rôle, and am not at all called upon to do so, nevertheless as what I have to say is rather in mitigation of his offence, I must be regarded somewhat in that light. And first, we are all sinners, miserable sinners, as the Church puts into our proper confession, but I doubt if it is right for us to apply the word *inter nos*. There has been quite a shower of adjectives unenlivened by wit, as well as of censure unredeemed by humor, and often unexcused by candor, in our entomological press, and to this I have, in my humble way, quite strongly objected. We are not authorized by our positions to assume so much, nor is our subject sufficiently important, as the world goes, to warrant the issue of ukases upon entomological topics. The particular offence of Mr. Scudder in the matter of names is that of the English ones. Now English names for insects existed before Latin ones, as might indeed be

supposed. I think it is De Saussure who assures us of the ultimate triumph of the English tongue in the contest for existence between the languages, and it is a matter of at least secondary importance that the English names of our butterflies come into use. A butterfly has as good a right to an English, or common name, in an English speaking country, as a plant. And plant names are part of our literature, of our poetry. Perhaps what I said in the "Popular Science Monthly" might be repeated here. The introduction of common names for our Lepidoptera is evidently a matter not to be forced, but to be left to itself. The rule of priority which Linnæus appointed to govern Latin names cannot obtain here. Some of our butterflies have received several English names, as our "Milk-weed butterfly." Some of the names for moths in use in England are very pretty, such as the "Arches" and "Wainscots." English names will, it is to be hoped, gradually appear in our American literature and come into use. The vernacular names proposed in our economic works, mere translations from the Latin, are often very ugly and have nothing to commend them. But see what lovely names they have in England for their moths! The "Kentish Glory," the "Peach Blossom," the "Buff Arches," the "Common Wainscot." About the vernacular names for our moths must come the cooling touch of time; they cannot be struck out in the heat which accompanies the coining of a Latin name for a new species (struggling for priority). Around their cradle some tutelary divinity must hover; some old and idle tale, like an ancient crone, must be its nurse; out of some melody, dedicate to fields and flowers, must the words be taken which are to serve as the common title of the insect haunting these pastures. And not the first but the best known, and in itself the best name, must be chosen, and to exercise this choice there must be some literary taste in the writer, some quaint appositeness in the name itself. Here, in Germany, with its wonderfully supple language, and the frequency of compound words, common names have been easily made and pass current. My young friend Eugene, as to trusting whom with a cyanide bottle I feel some scruples, talks quite glibly and confidingly to me about the "Grosser" and "Kleiner Fuchs;" the latter he has not been able to catch yet, but he knows how it looks from his little handbook, which has fairly good figures and the common name preceding the Latin one for each species. It seems to be a fact, and I do not see how Mr. Edwards can get around it, that young ento-

mologists, *aetat* 10 for instance, prefer their living nursery language to the dead one from the tombs. And we are well counselled to remember the little ones always! What would I not have given to have known the common names for our insects on Staten Island in the fifties!

What Mr. Maynard may choose to call our butterflies cannot be thrown up against Mr. Scudder, who, as I understand it, has merely proposed corresponding titles for our butterflies with those used in England, as the "Blues" and "Coppers," using these names in somewhat of a generic sense and supplying some fresh titles of his own, whether fortunately or not, I am not here enquiring. This is a matter subject to a later review on occasion. Certainly we must be guided by some general agreement with English names in use in England for similar but different species, and this without a too vigorous enquiry. Certain hairy caterpillars in England (and in Germany also) are called "Bears" (I don't know what brings Bacon's curious sentence, "the body of nature is elegantly and with deep judgment depicted hairy," etc., into my mind), and there are certain common names used in a generic way from resemblances occurring to the casual observer. These we must use, and for my part I think that, in a natural way, we shall come into using certain common names as collecting becomes popular among the young and as popular books increase with us.

Far more than on this head am I concerned about Mr. Scudder's proposed book on our butterflies. I think there is a mean between Mr. Scudder's Latin nomenclature and that of Mr. Edwards, which latter is based on Doubleday's, and perhaps since Doubleday we may have advanced in our knowledge as to the structure of butterflies, and are authorized to express this advance in our Latin names. It is many years ago since Mr. Robinson and I set about classifying our Diurnals, and this was before Mr. Scudder's classification. I only published about that time the genera *Fenisca* and *Calephelis*, and as these are not objected to, I think that what I here say, with great diffidence, is entitled to some consideration on both sides. I am quite satisfied, and was before Mr. Scudder, that our Hackberry butterflies, *celtis*, *clyton*, etc., do not belong to the European genus *Apatura*, and that the structural characters separating the two are real and of generic value. Also am I of opinion that our eastern *arthemis*, *ursula*, *disippus*, *eros*, form a group of themselves, distinct from *Limenitis* proper, and that Mr. Scudder's

term *Basilarchia* should be retained. On the other hand I think Mr. Scudder's divisions of *Argynnis* and *Lycaena* are not valid, as now shown by Prof. Peabody and others. I hope Mr. Scudder will not retain these, and also that he will be guided by Dr. Speyer's classification of the *Hesperidae*. These latter afford good, apparent, readily understood generic characters as we understand these in the moths, and there is nothing gained by making too many genera out of them on "measurements." These latter are now proved to be illusory, and should not be again brought forward. As to the general arrangement of the families, the arrangement of Meigen and others, commencing with the groups in which the front legs are useless for walking, and which are taken out of the ambulatory series, has an approved philosophic basis. It is warranted under Prof. Dana's theory of cephalization. Mr. Scudder's paper on the structure of *Papilio* in the Transactions of the American Entomological Society, has not been answered. I think the caterpillars of *Papilio* are of a lower type than those of the rest of the true butterflies, and that there are no reasons for placing the "Swallow Tails" at the head of the rest except that they are large and showy insects. The structure of the feet is evidently of importance no less than the method of pupation, and this is recognized consistently in Mr. Scudder's arrangement. There is certainly no system in commencing with the groups with six walking legs, then following with those of four, and winding up again with those with six. The moths have generally six walking legs, and the abortive front pair may be consistently regarded as a later phase. I have great confidence in Mr. Edwards's remarks as to genera, that these can be traced in all stages from the egg upwards, and in this respect it would be well if Mr. Scudder, for the sake of reason, which, as Zschokke says, is the "daylight of the mind," would abate from hair-splitting. But I have great regard for Mr. Scudder's general appreciation of classificatory characters and those which point to higher or lower rank and which determine the confines of large groups, and on this head it would be well if Mr. Edwards relented from his present views. There is then, to my mind, a possible agreement between the two authorities, and that such an agreement would be of great value cannot be doubted. Where there is any reasonable principle involved, I advise neither to give way. Time, Mr. Strecker's friend, must level such differences by throwing more light on the subject. But much that divides the two scientists lies in the

wide domains of unreason, upon which we all trespass during our earthly journeyings, and where many of us, I am afraid, almost permanently reside.

STUDIES OF THE NORTH AMERICAN PROCTOTRUPIDÆ, WITH DESCRIPTIONS OF NEW SPECIES FROM FLORIDA.

BY WILLIAM H. ASHMEAD, JACKSONVILLE, FLORIDA.

Sub family PLATYGASTERINÆ.

In this second paper on the North American *Proctotrupidæ*, I have taken up the sub-family *Platygasterinæ*, comprising, for the most part, small black species, all parasitic in larvæ belonging to the Dipterous families *Cecidomyiidæ* and *Tipulidæ*.

It will be seen that I have recognized in our fauna species in all of the described genera but *Iphetrachelus* Haliday, and one new genus parasitic on Cecidomyious hickory galls.

XLVI. *Iphetrachelus* Haliday.

XLVII. *Allotropa* Foerster.

74 (1). *Allotropa Americana*, n. sp.

♂. Length, .07 inch. Black, sub-opaque, finely punctate, scape and legs pale brown. Antennæ 9-jointed, terminating in a 4-jointed club, joints serrate, flagellum and club dark brown. Mesothorax with two grooves. Scutellum convex, rounded posteriorly. Abdomen black polished, first and second segments striate, the second segment greatly lengthened. Wings hyaline.

Hab.—Florida.

XLVIII. *Metaclisis* Foerster.

75 (1). *Metaclisis belonocnemæ*, n. sp.

♀. Length, .07 inch. Black, finely punctate. The 10-jointed antennæ and legs pale brown. Thorax with two grooves. Wings hyaline.

Hab.—Florida.

Described from one specimen, reared in April, 1883, from galls. *Belonocnema Tretæ* Mayr, probably parasitic on a Cecidomyious guest fly inhabiting this gall.

XLIX. *Monocrita* Foerster.

76 (1). *Monocrita melanostropha*, n. sp.

♀. Length, .08 inch. Black, sub-opaque, finely punctate, middle of mesothorax and the somewhat flattened scutellum, polished. Antennæ entirely black, terminal joint one-third longer than the preceding joint. Mesothorax with two grooves. Legs red, the femora obfuscated or blackish. Abdomen polished black. Wings hyaline, submarginal vein black.

Hab.—Florida.

77 (2). *Monocrita Canadensis*, n. sp.

♀. Length, .14 inch. Black, head and prothorax finely punctate. Antennæ 10-jointed, filiform antennæ with the legs are pale brownish yellow. Thorax with two deep grooves, converging and almost meeting posteriorly. Scutellum slightly convex, punctate, pubescent, separated from the thorax by a deep depression. Wings fuscous.

Hab.—Canada. Kindly given me by Mr. W. H. Harrington.

L. *Isostasius* Foerster.

78 (1). *Isostasius musculus*, n. sp.

♀. Length, .04 inch. Black, polished. Ocelli distant from inner border of eye. Antennæ 10-jointed, black, club 4-jointed, the joints broader than long. Thorax without grooves. Legs black, femora at base and tarsi reddish. Abdomen ovate, not quite as long as the thorax, and but slightly compressed from above. Wings hyaline, submarginal vein black; no other veins.

Hab.—Florida.

LI. *Inostemma* Haliday.

79 (1). *Inostemma Horni*, n. sp.

♂, ♀. Length, .06 to .07 inch. Black, sub-opaque, microscopically punctate. Antennæ 10-jointed, entirely black. The horn in female is prolonged over the thorax, extending to base of ocelli, gradually narrowed at base. Legs black, tarsi pale brown, in some specimens the tibiæ are pale at tips. Abdomen acuminate ovate, longer than head and thorax combined. Wings hyaline, submarginal vein black. The male is without the projecting horn, and is difficult to distinguish from other species in this group, the shape of the abdomen, which is acuminate ovate, less depressed than any others, and the basal ocelli, which are contiguous to the

inner border of the eye, must be depended upon to separate it. The mesothorax has two delicate grooves.

Hab.—Florida.

This species is dedicated to my friend, Dr. Geo. H. Horn, the distinguished American Coleopterist. It is at once distinguished from the European *Inostemma Bosci* by its stouter form, shorter horn; in that species the horn projects over the entire head; and by its differently colored legs.

80 (2). *Inostemma Cressoni*, n. sp.

♀. Length, .09 to .10 inch. Robust, black, finely punctate. It is at once distinguished from *I. Horni* by its larger, more robust form, its much stouter horn, which is of a uniform thickness throughout, not narrowed at base, and by having rufous colored tibiæ and tarsi.

Hab.—Florida.

Described from two specimens and dedicated to my friend, the learned American Hymenopterist, Mr. E. T. Cresson.

81 (3). *Inostemma Rileyi*, n. sp.

♂, ♀. Length, .04 inch. Black, polished. This species is at once distinguished from all others by its much smaller size, rufous colored femora and tibiæ, sometimes obfuscated in the middle, and the horn in female extends only to the base of the head.

Described from ten specimens, and dedicated to my friend, the eminent economic Entomologist, who so ably fills the position of U. S. Entomologist, Dr. C. V. Riley.

82 (4). *Inostemma Packardi*, n. sp.

♀. Length, .07 inch. This species is at once distinguished from the others by the brevity of its horn, which reaches only slightly beyond the middle of the thorax and obliquely truncate at tip, not rounded as are the tips in the other species. Head and pleuræ punctate. Antennæ black, scape reddish at base. Legs red, coxæ at base black. Wings hyaline, submarginal vein black.

Hab.—Florida.

Described from one specimen, and dedicated to my learned friend, Prof. A. S. Packard, from the study of whose excellent work, "Guide to the Study of Insects," I early derived so much benefit and imbibed some of my love for the study of insects.

LII. *Acerota* Foerster.

83 (1). *Acerota opaca* Prov. Add. et Corr. a la Faune Hym., p. 184.
Hab.—Canada.

84 (2). *Acerota caryæ*, n. sp.

♂, ♀. Length, .07 to .09 inch. Black, shining, microscopically punctate. Antennæ and legs pale yellowish-brown. The four-jointed antennal club is black or brown, in the male the antennæ are generally uniform yellow-brown. The mesothorax has two faint grooves on its disk; scutellum prominent, slightly pubescent. Abdomen smooth, polished. Wings hyaline.

Hab.—Florida.

85 (3). *Acerota Floridana*, n. sp.

♀. Length, .07 inch. Black, antennæ and legs dark red; two grooves on mesothorax; scutellum sparsely pubescent; metathorax with denser, longer, white pubescence. Wings hyaline.

Hab.—Florida.

LIII. *Catillus* Foerster.

86 (1). *Catillus maculipes*, n. sp.

♀. Length, .03 inch. Black, polished. Antennæ and legs rufous, femora and tibiæ with dark blotches above. Mesonotum without grooves. Wings hyaline.

Hab.—Florida.

LIV. *Xestonotus* Foerster.

87 (1). *Xestonotus andriciphilus*, n. sp.

Female. Length, .07 inch. Black; face finely punctate. Antennæ and legs brownish-yellow. Mesothorax with two sharply defined, parallel grooves. Scutellum not greatly prolonged, but compressed at sides. Wings hyaline.

Hab.—Florida.

Described from one specimen reared from the Cynipidous gall, *Andricus blastophagus* Ashm.

LV. *Amblyaspis* Foerster.

88 (1). *Amblyaspis longipes*, n. sp.

Male. Length, .08 inch. Form somewhat slender, black. Antennæ and the unusually long legs pale yellowish brown; flagellum darker, the

last joint being twice as long as preceding joint, cylindrical, the others narrowed at base. The scutellum is very long, acute, elevated over the metathorax. Metathorax covered with white pubescence. Wings hyaline.

Hab.—Florida.

This species bears a close resemblance to *Amblyaspis alienus* Nees, but the scutellum is longer and more acute.

89 (2). *Amblyaspis Americana*, n. sp.

Female. Length, .04 inch. Black. Antennæ and legs pale brown, posterior femora and tibiæ obfuscated toward tips. The apex of the long scutellum is yellowish, and the hyaline wings have their borders strongly ciliate, differing in this respect from all other species in my collection.

Hab.—Florida.

LVI. *Leptacis*, Foerster.

90 (1). *Leptacis cynipsiphila*, n. sp.

Male and female. Length, .05 to .07 inch. Black. Head in front finely punctate. Antennæ and legs rufous. Antennal club 4-jointed, dusky. Thorax sparsely, metathorax densely covered with white pile. Scutellum with a small acute projecting spine at tip. Wings hyaline, strongly pubescent.

Hab.—Florida. Described from specimens reared from an oak gall.

LVII. *Isorhombus*, Foerster.

91 (1). *Isorhombus hyalinipennis*, n. sp.

Female. Length, .05 inch. Black. Antennæ and legs pale brown; the three-jointed club which distinguishes this genus from *Leptacis*, is black or dark brown. The mesothorax is without grooves, the scutellum slightly pubescent, unarmed. Wings hyaline, almost devoid of pubescence.

Hab.—Florida.

LVIII. *Epimeces*, Westwood.

(= *Ectadius*, Foerst.)

92 (1). *Epimeces Americanus*, n. sp.

Male and female. Length, .04 to .07 inch. Slender, black, shining. The filiform antennæ and legs are dark rufous. Mesothorax with two grooves. Abdomen narrow, elongate, sub-cylindrical, gradually narrowed towards tip, about one-third longer than head and thorax combined. Wings hyaline.

Hab.—Florida.

This species is very much smaller than *Epimecis subulatus* Nees, which it closely resembles. The genus *Ectadius* Foerster seems, without doubt, to be identical with this genus, as I have indicated.

LIX. *Sactogaster*, Foerster.

93 (1). *Sactogaster anomaliventris*, n. sp.

Female. Length, .03 to .05 inch. Black, polished. Antennæ and legs black ; tarsi reddish. The joints of the four-jointed antennal club are broader than long. Mesoscutum smooth, without grooves. Scutellum armed with a small acute spine. The second abdominal segment is inflated below, having the appearance of a small globe ; the other segments are narrow, cylindrical, and project beyond it in the form of a tail. Wings hyaline.

Hab.—Florida.

LX. *Synopeas*, Foerster.

94 (1). *Synopeas melanocera*, n. sp.

Female. Length, .10 inch. Black, polished. Face, just above insertion of antennæ, grooved, and thence to ocelli finely punctate. Antennæ filiform, black, the terminal joint longer than the preceding. Mesothorax with two grooves. Scutellum with a small spine near tip. Legs dark red. Abdomen as long as head and thorax combined. Wings hyaline.

Hab.—Florida.

LXI. *Anopedias*, Foerster.

95 (1). *Anopedias incertus*, n. sp.

Female. Length, .06 inch. Somewhat robust, black. Antennæ and legs rufous, thighs obfuscated. Antennal club 4-jointed, brown-black. Thorax without grooves. Scutellum flattened, with a spine at tip. Mesopleuræ highly polished ; metapleuræ and metathorax densely pubescent. Wings hyaline.

Hab.—Florida.

The structural characters of this species seem to agree with the definition of this genus, but I have doubts as to its belonging here.

LXII. *Isocybus*, Foerster.

96 (1). *Isocybus longiventris*, n. sp.

Female. Length, .04 inch. Black, highly polished. Head large, cubical. Antennæ and legs pale yellowish-brown. Thorax rather short,

much narrower than head, smooth. Abdomen long, acuminate ovate, nearly twice as long as head and thorax combined. Wings hyaline.

Hab.—Florida.

This species is placed in this genus only provisionally, as the non-grooved thorax and shape of abdomen will probably exclude it from the genus.

LXIII. *Trichacis*, Foerster.

97 (1). *Trichacis brunneipes*, n. sp.

Female. Length, .10 inch. A slender, elongate, polished, black species. Antennæ and legs pale yellowish-brown, flagellum and club rust-brown. Mesothorax with two parallel grooves. Scutellum, which is transversely convex, is well separated from thorax by a deep depression, and has a thick tuft of grey pubescence at tip. Metapleuræ densely pubescent. Wings dusky hyaline.

Hab.—Florida.

LXIV. *Hypocampsis*, Foerster.

98 (1). *Hypocampsis Pluto*, n. sp.

Female. Length, .06 inch. This species is highly polished, including antennæ and legs, entirely black. Mesothorax with two grooves. Scutellum rounded, highly convex. Abdomen with the lateral carina broad and turned downwards. Wings hyaline.

Hab.—Florida.

LXV. *Polygnotus*, Foerster.

99 (1). *Polygnotus solidaginis*, n. sp.

Male and female. Length, .05 to .07 inch. Black polished. Antennæ dark reddish-brown, scape paler; club, female, five-jointed; male antennæ filiform. Legs dark red, femora black, tibiæ obfuscated. Mesothorax smooth, without grooves. Scutellum elevated, highly convex, more than twice as broad as long, and separated from mesothorax by a deep transverse groove. Wings hyaline.

Hab.—Florida.

Described from numerous specimens reared from a Cecidomyious gall (*Cecidomyia nebulosa* Ashm. MSS.) From six to eight specimens were reared from each fly; they make parchment-like cocoons, placed side by side, as illustrated by Prof. Westwood on the genus *Platygaster*, "Introd. to Study of Insects," vol. ii., f. 78, No. 14.

100 (2). *Polygnotus baccharicola*, n. sp.

Male and female. Length, .03 to .06 inch. Black, polished. Differs from the above species in its smaller size, more slender form and in having uniformly colored dark red legs. The femora are not black.

Hab.—Florida.

Described from numerous specimens reared from a Cecidomyious gall (*Cecidomyia baccharicola* Ashm. MSS.)

LXVI. *Platygaster*, Latreille.

101 (1). *Platygaster pallipes* Say, Leconte's Ed. Say's Works, I., p. 383. Hab.—Indiana.

102 (2). *Platygaster Canadensis* Prov. Add. et Corr. a la Faune Hym., p. 181. Hab.—Canada.

103 (3). *Platygaster error* Fitch. Sixth Rep. N. Y. State Agr. Soc., p. 818. Hab.—New York.

104 (4). *Platygaster Herricki* Packard. Third Rep. U. S. Ent. Comm., p. 220. Hab.—Western States.

105 (5). *Platygaster Floridensis*, n. sp.

Female. Length, .06 to .07 inch. Black, polished, more slender than *Platygaster niger* Nees. Antennæ and legs of a uniform pale yellowish-brown. Mesothorax smooth. The scutellum is convex, broader than long, and is not separated from the mesothorax by a deep transverse groove, as are the species in the genus *Polygnotus*, sparsely pubescent towards tip. Wings hyaline.

Hab.—Florida.

106 (6). *Platygaster gracilis*, n. sp.

Male. Length, .05 inch. Very slender, polished black. Antennæ filiform, black, scape at base pale brown. Legs reddish, femora obfuscated. Wings hyaline.

Hab.—Florida.

The new genus recognized in this family will be described in another paper, when I hope to be able to give a good illustration of its peculiar characters.

STRAY NOTES ON MYRMELEONIDÆ, Part 2.

BY DR. H. A. HAGEN, CAMBRIDGE, MASS.

1. *Species figured in A. Seba Thesaurus.*

I have quoted, Synops. Hemerob., p. 457, as belonging to *Pamexis*, a new species figured in Seba Thesaur., vol. iv., pl. 86, f 20. The explanation says, "Color pallide subfuscus, maculis suture fuscis." I can not here compare a colored copy of Seba's work, nevertheless the figure proves to be a male of a species of *Pamexis* without antennæ. The figures of insects in Seba are not good; but as the species belongs surely to *Pamexis*, and is larger than the other known species, and different from them, I wish to draw attention to the existence of a new species of this curious genus. It is, besides the figure given by Thunberg, the only species figured. Seba's collection was sold in the beginning of the last century to Peter the Great, but as far as I know, was destroyed entirely in St. Petersburg, as well as the collection of Madam Merian, of which only a few of the large Lamellicorns are left. Seba has figured on plate 86 six Myrmeleonidæ, five of which belong to *Palpares*. Fig. 17 is quoted by Linné, Syst. Nat. ed. xii., in the appendix, to be his *Libellula capensis*, p. 904, n. 19. This species belongs certainly to a *Palpares* from Cap. b. sp. Among the species known to me it is near to *P. latipennis*; the quotation in my Syn. Hemerob., p. 456, by *P. latipennis*, f. 5, is a typographical error for f. 17, as Prof. Brauer justly remarks.

Of the four other figures by Seba, is f. 18, a male of *Palpares*, perhaps the unknown male of *P. Caffer*. The fig. 5 is, as Prof. Brauer has proved, Wien. Z. B. Ges., xvii., p. 521, *Myrmeleon sinuatum* Oliv., Enc. Meth., viii., p. 121, No. 4, from Cap. b. sp., which was described only from Seba's figure. The figure well represents *Palp. haematogaster* Gerst., except that the posterior margin of the hind wings is not subfalcate, as in Gerstaecker's species. Therefore Prof. Brauer believes it to be different. McLachlan, Jour. Linn. Soc., ix., 243, has established for *P. haematogaster* the genus *Crambomorphus*, and believes Olivier's *M. sinuatum* to be the same species; but he has apparently at the time not compared Seba's figure, as he would have stated the difference of the hind wings. For the species *P. gigas* Drury, *contrarius* Walk., *moestus* Hag., and *falcatus* McLachlan, this author has established the genus *Symma-*

thetes; but he writes always *P. gigas* Dalman instead of Drury, for which error probably I am responsible. Dalman has only given a diagnosis made from Drury's figure, which diagnosis is so defective that Burmeister applied it to a very different species.

The figures 12 and 13 on Seba's plate belong probably to the genus *Stenares;* as far as I know, they are not yet determined nor quoted anywhere.

2. *Acanthaclisis Americana.*

Drury, Ins., vol. 1, p. 111, No. 4, pl. 46, f. 4. Burm., ii., p. 996, No. 17. Ramb. Neur., p. 380, No. 4. Hag. Syn. Neur. N. Amer., p. 223, No. 1. Taschenberg, Zeitschr. Halle, 1879, vol. 52, p. 186. See for literat., Hag. Syn. Hemerob. Stett. E. Zeit., 1866, p. 378.

Brown, clothed with whitish hairs, stout; front and labrum yellow to the antennæ, whitish villous above; vertex reddish brown with two large flat elevations, separated by a middle impressed line; cut straight in front; anteriorly with a yellow band; on top a black band, and a transversal series of flattened spots, and some behind, two of them approximate in the middle, all black; antennæ strong, a little longer than the prothorax, flattened on tip, black, the joints with a yellow basal ring; the basal joints below yellow. Maxillary palpi short, yellow, the joints a little brownish at base; the third joint longer, thickened on tip, curvate; the fourth a little shorter than the fifth, which is cylindrical, a little curvate on the base, the tip obtuse, very little notched. Labial palpi longer, black, hairy; second joint curvate on the base, thickened on tip; third joint a little shorter, straight, fusiform on tip, which is yellow, or yellow-pointed black, suddenly thinned and pointed. Prothorax a little longer than broad, narrowed in front; side margins straight; front margin sub-convex, with a small median notch; a strong transversal dorsal depression before the middle of the prothorax is a little curvate, more curvate near the side margins; another smaller depression exists near the mesothorax; the prothorax dull grayish brown, with a large black longitudinal median band, and another on each side on the side margin, not well defined; a yellow spot, little visible, each side externally near the anterior depression; prothorax above clothed with long black hairs, and with whitish ones laterally. Mesothorax grayish brown, with a black median band, and another on each side; below the whole thorax is rufous brown, whitish villous. Legs strong, short, whitish villous, mixed with black hairs, blackish brown,

femur brown, a little fallon at base ; tibia blackish externally, with a narrow ring, and a spot more apical yellow ; tarsus black, base of last joint yellow ; spurs brown, as long as the three basal joints, pointed, curvate in demi-circle, but not fractured ; claws brown, after a short, larger base, suddenly curvate. Abdomen strong grayish black, base whitish villous ; end of abdomen black. Wings large, hyaline, similar to *A. occitanica ;* veins black interrupted with yellow ; space between sub-costa and median and space between the fourth and fifth vein nearly filled with brown dots ; some brown apical dots on the small forks of the veinlets ; some brown shadows on the hind margin after the oblique vein ; hind wings a little longer ; space between sub-costa and median a little spotted, and a brown spot on the end of the hyaline space between fourth and fifth vein ; the pterostigma of all wings yellow, internally with a black dot, costal space of front wings in the apical half or two-thirds with a double series of irregular cells ; costal space of hind wings with undivided ante-cubitals ; all wings moderately pointed, hind wings slightly sinuated before tip on hind margin ; all wings on tip with a series of small gradate veins beginning behind the pterostigma, running down in a curve in the middle of this part of the wing and ending opposite to the tip ; in the fore wings are between 15 to 9, in the hind wings 7 gradate veins.

Length of body 47 to 50 m.m. ; length with wings, 64–75 m.m. Exp. al. 110 to 130 m.m.

Hab.—Newbern, North Carolina, coll. by Ordway, presented by Mr. S. H. Scudder ; Millin, Scriven Co., Georgia, near Ogechee River, coll. by H. K. Morrison; Crescent City, Florida, raised by Mr. H. G. Hubbard. The three specimens before me are all females. I have seen besides three females. The type of Prof. Burmeister, from South Carolina, coll. by Zimmermann.* As far as known to me, this specimen was the only one known to exist in Europe till 1867. I have seen it only after the publication of my Synopsis. Further, a female from Florida in Mr. S. Henshaw's coll., and a female from Sandy Hook, New York, in Mr. H. Edwards's coll. As the first specimen described and figured by Drury in 1770 is said to be from New York, Mr. Edwards's specimen is especially interesting. He found it in a small inn, inside near the window, last summer. Mr. L. Cabot told me that he had seen this species several

* The type of Burmeister is described by E. Taschenberg, Zeitschr., 1879, p. 126. It should have been stated CANAD. ENTOM., vol. xix., p. 111, that the type of *P. pardalinus* Burm. has been described l. c. p. 184.

times when hunting in N. Carolina. Mr. H. Garman, from Champaign, Illinois, informed me that he collected three females in the house of the John Hopkins Marine Laboratory, at Beaufort, N. Carolina, inside near the window. Newbern is only a few miles distant from Beaufort. Among my papers I found a description of a female from Columbia, from the collection of Mr. H. de Saussure, in Geneva, Switzerland. This species is quoted without description in my list of South American Neuroptera, p. 324, as *Acanthochisis striata* Hag. The description was made more than thirty-five years ago, when I had never seen the North American species. Now in studying *A. americana*, I was astonished to find that the description of *A. striata* agrees so well that there cannot be any doubt of the identity of the two species. Indeed the description printed above is my old one of *A. striata*, to which I was not able to make additions or corrections after the new material. The specimen was returned at the time to Mr. de Saussure, and will be in his own collection or in Geneva Museum.

The figure of the male by Drury is similar to the female, and is indeed well made. The venation is accurate, and gives also an indication of the gradate series on the tip. The costal space shows a double series of cells to the base, probably an error, as in the specimens seen by me at least the basal third has only one series. The basal knob on the hind margin of the hind wing is wanting in the figure. The anal appendages a little longer than 3 m.m., are slightly bent. The dimensions of the figure are like those of the female; the length of body greater, nearly 60 m.m. The description agrees except that the thorax is said to be yellow, though the figure gives it gray.

(To be Continued.)

A PRACTICAL NOTE ON COLLECTING INSECTS.

BY PROF. E. W. CLAYPOLE, AKRON, OHIO.

In reference to two notes on collecting in the June number of your Entomologist, will you allow me to make a few remarks? Entomology is with me a secondary subject, my time being for the most part occupied with another science. Perhaps this has led me to devise means for economizing time and labor more than I should otherwise have done;

but the study of insects has great attraction for me, and I spend no little time upon it.

The method which I desire to mention may be too well known to deserve any space in your columns—if so, I can only ask you to overlook my intrusion—but I have never seen it mentioned in print anywhere. nor have I ever seen it used by any entomologist of my acquaintance. Perhaps also there may be some objections to its adoption which I have not discovered in the course of several years' use. In that case I shall be glad to learn them.

Your contributors speak of chloroform and cyanide of potassium as their favorite insecticide materials. Both these I have abandoned for some years, the former because it is expensive, and the latter because it is unpleasant and dangerous, especially the latter to young students, and both because they are comparatively imperfect in their effects. For example: I have often known an insect, especially one of the large bodied *Bombycids*, that recovered after having been apparently killed by chloroform, and even after having been pinned out in the case. The result usually is that it is seriously injured by flapping about. Chloroform is an anæsthetic and not a poison, and its effect soon passes off unless its action is renewed or long continued so as to insure death.

In regard to cyanide of potassium, I may state that last year I found one of my cases badly infested with the fur moth *(T. pellionella)*. I put an open bottle containing cyanide of potassium into the case and closed it. For a fortnight it remained so, when desiring to know the result of the poison, I opened it. It was strongly impregnated with the well known smell of the cyanide. To my surprise, however, I could not find a dead moth, and the larvæ were as lively after breathing for fourteen days the so-called deadly atmosphere as if they had been all the time in the open air. As a substitute for both of these I have for years used no other insecticide for the purpose of killing my specimens than benzine or gasoline. The latter at fourteen cents a gallon is merely nominal in cost and perfectly efficacious in action. I use it without hesitation on the Lepidoptera in any quantity. With most of them it causes instant death, and with the few that slightly resist its effects the resistance is very short-lived. I recollect one day seeing a large *Cecropia* moth enter the room where I was sitting and alight on the knob of the door handle. I took my bottle of gasoline and poured some of the liquid on the body of the

insect, when it dropped to the floor as if shot and never moved a wing. The result is not in all cases quite so rapid, but it is never tedious. By this means I prevent the mischief that ensues when a fine specimen flutters in a bottle of cyanide or chloroform for several minutes, as is often the case.

I employ the same plan with all insects, and with equal success. The moths that so long resisted the cyanide vapor, as mentioned above, at once yielded to the deadly gasoline, and in five minutes not a living larva was left in the case.

I need scarcely add that the use of this exceedingly volatile liquid never in the least degree injures the delicate plumage of the Lepidoptera. Many of my best specimens have been repeatedly drenched with gasoline. In five or ten minutes they are as dry as before it was applied.

Let me add one word more. I find the most convenient way of applying the gasoline is to carry it in an ounce phial, having a cork through which passes a finely pointed glass tube. The large outer end of this tube is capped with a small india-rubber capsule. The whole may be bought at a drug store for a few cents, under the name of a dropping tube. In this way the tube is always full of liquid ready to be squirted out on an insect in the net or even at rest in the open air, and the specimen is at once fit to be pinned out. This I do on the spot in a cigar box, or in one lined with cork, and so avoid an accumulation of material, which is a great annoyance to a man whose time is otherwise occupied, or indeed to any one at the end of a hard day's work.

The small weight of the outfit here required is an advantage not to be overlooked when compared with the weight of the loaded cyanide bottle usually employed. There are one or two other points which I should like to mention, but having already written more than at the outset I intended, I will forbear.

CORRESPONDENCE.

BRACHYS AEROSA AND BRACHYS OVATA.

Dear Sir: I notice Dr. Packard, in his "Bulletin No. 7," on "Insects Injurious to Forest and Shade Trees," speaks of *Brachys aerosa* M., as probably mining the leaves of our oaks in its larval state, but says

that its life history is not known. I am not aware that the habits of this beautiful little Buprestid have since been published, and as I have reared two fully developed specimens from the larvæ, I think it may be of interest to the readers of the ENTOMOLOGIST to know the life history so far as I have been able to determine it.

Last Oct., while collecting leaf-miners from not less than twenty different trees and shrubs at the Michigan Agricultural College, I took two poplar leaves from which I got, to-day, the two beetles above mentioned. The following is the description of one of the larvæ made at the time they were taken :

Mining the leaves of our common poplar next to the upper surface. A whitish larva 9 m.m. long, broadest at head and gradually tapering to the tail. Jaws brown and first joint back of head with brown rectangular plates above and below. The anal end with a small black spine extending back which is used by the larva in pushing itself forward. Larva quite flat and segments deeply notched.

B. ovata Web.—A leaf of either the red or black oak containing a leaf-miner was taken at the same time, and from this I got *B. ovata* less than a week ago. No description of the larva was made.

C. P. GILLETTE.

Michigan Agricultural College, May 7th, 1887.

BOOK NOTICES.

RHOPALOCERA MALAYANA : A Description of the Butterflies of the Malay Peninsula. By W. L. Distant. London, 1882–86, 4°, 16 ; 486 p., 46 plates.

A short time ago we called attention to a work in progress on the Butterflies of India. Immediately thereafter there came to hand the final part of another notable work on the butterflies of a region still nearer our antipodes—the Malay Peninsula. In this instance the work was undertaken by the author under peculiarly favorable circumstances, inasmuch as all pecuniary anxiety was removed by the appearance of a Maecenas in the person of Mr. D. Logan, of Penang, to whom all credit is due by naturalists the world over, not only for the generous way in which he has allowed the work to be gotten up and illustrated, but for his excellent choice of an author. For Mr. Distant, on his side, has performed his task

in a very scholarly manner, and given us a book leaving little to be desired, beyond that constant and bitter craving of naturalists for a knowledge of the earlier stages of life of the insects treated. We could indeed wish that the structural characteristics of the larger divisions had been more amply treated, and that the author had not rested satisfied with groupings in the Lycaeninæ and Hesperidæ, newly manufactured, confessedly artificial and temporary, and to which the very descriptions which follow do violence. But the excellence of the entire work, the consistent manner in which the task has been carried out, the technical skill, excellent judgment and broad learning everywhere displayed, as well as the very considerable addition to our knowledge involved, disarms adverse criticism and invites only praise. Would that such a Maecenas and such an author might oftener company together!

The work is published in quarto in sumptuous style, is unexceptionable in typography and profusely illustrated. Besides 46 plates of some of the best chromo-lithographs of butterflies which we have ever seen, there are 129 wood cuts scattered through the text, generally illustrating special structural features, especially in neuration and leg structure, which are of the greatest value. The author, as would have been expected of one of our best lepidopterists, familiar with the structure as well as the early stages, the form and coloring of butterflies, has followed closely in the lines of the classification made prominent in recent years by Bates, in which the Hesperidæ are immediately preceded by their nearest allies, the Papilionidæ. It remains only to say that a good deal of interesting reading will be found scattered through the portly volume, and that there are points in the preface worthy of careful attention. About 500 species are described.

SAMUEL H. SCUDDER.

THE OTTAWA NATURALIST. Vol. i., Nos. 1 and 2, April and May, 1887.

A welcome addition to our few Canadian serials on Natural Science; we heartily wish it abundant success.

A REVISION OF THE LEPIDOPTEROUS FAMILY SATURNIIDÆ. By John B. Smith. Proceedings of the United States National Museum. Washington, Dec., 1886.

A very valuable illustrated paper on this interesting family of moths.

The Canadian Entomologist.

VOL. XIX. LONDON, AUGUST, 1887. No. 8

ELAPHIDION VILLOSUM, Fab.

BY JOHN HAMILTON, M. D., ALLEGHENY, PA.

The account of this insect given by the early fathers of Economic Entomology is so charming that it seems almost profane to disturb a history accepted by most of their credulous offspring with unquestioning faith. Its wonderful habits and supra-rational instincts have been stock in trade ever since, and, like the fiction of the fly walking on glass by a sucker arrangement of its feet, is likely to hold its place in paste and scissor literature for all time to come.

Divested of all romance and imagination, and descending to facts, the observations of Professor Peck, Fitch and Harris may be reduced to this. In the month of July the parent lays the eggs on the limbs, or in the axil of a leaf near the end of the twigs of that year's growth of various species of oak, and perhaps other trees. After hatching, the young larva (in the latter case) penetrates to the pith and devours it downwards till the woody base is reached, and so onward to the centre of the main limb; here it eats away a considerable portion of the inside of the limb, and then plugging the end of the burrow, which it excavates towards the distal end, eventually falls to the ground with the limb, which being weakened, is broken off by the high autumnal winds. They exist here either as larvæ or pupæ till spring, and emerge in June as perfect beetles. Time, one year, though not so stated in words.

The account given in detail below is so different from the above, that were the identity of the individuals not established by actual comparison and by recognized authority, it might well be asserted I had given an account of some other *Elaphidion*.

April, 1883, I procured a barrel of hickory limbs from a tree girdled early in 1882; the limbs were from one-half to one inch in diameter. Very few things developed from them that season: but the next (1884) quite a number of species came forth—*Clytanthus ruricola* and *albofasciatus*, *Neoclytus iuscus* and *erythrocephalus*, *Stenosphenus notatus*, etc.

Many larvæ of some Cerambycide continued to work on under the bark; late in the fall I observed the most of these had penetrated the wood, but some remained under the bark till April and May of the next year (1885). The most of the beetles appeared during the first two weeks of June, though individuals occurred occasionally till September. A few larvæ were still found at work, but by October they, likewise, had bored into the wood and appeared as beetles the next June (1886). The normal period of metamorphosis is therefore three years, but in individuals it may be retarded to four or more years.

At the present writing (June 5th) these beetles are issuing in great numbers from a barrel of hickory limbs obtained in April, 1885, from a tree deadened in January, 1884, thus verifying the first observation.

How the larvæ get under the bark could not be ascertained. When first examined, in April, they were from 4 to 5 m.m. long; they ate the wood under the bark, following its grain, and packed their burrow solidly with their dust. Their growth and progress were both slow, for by the next April they had scarcely more than doubled in length, and had not traveled more than from four to six inches during the year; but after July they developed an enormous appetite, and consumed the wood for at least an inch in length, and often entirely around the limb, ejecting their castings through holes made in the bark. When full fed, they bore obliquely an oval hole into the wood, penetrating it from four to ten inches. The larva then packs the opening with fine castings and enlarges a couple of inches of the interior of the burrow by gnawing off its sides a quantity of coarse fibre, in which it lies, after turning its head to the entrance. When about to become a pupa (I witnessed the process), the skin ruptures on the dorsum of three or four segments next the head; the head of the pupa appears, and after about half an hour's wriggling the whole body is divested of its covering. To the observer the pupa appears to crawl out of the skin, but in fact the skin with the large mandibles is forced backwards by the alternate extension and contraction of the segments, assisted materially by the fibre that surrounds it. After its soft body hardens, the same movements free it from the fibre, some being shoved in advance of the head, and some posteriorly, the exuviæ being often found at the distal end of the hole.

The time spent in the pupal state is indefinite, and does not seem to concern greatly the time of the appearance of the beetle. Sticks split open at different periods from December till March contained larvæ and

pupæ about equally, but no developed beetles. A larva that I observed to go into the wood in April appeared as a beetle among the first of such as had presumably pupated in the fall.

The number of these beetles obtained that and the present season was great, and afforded a good opportunity to observe individual variations, and they do differ greatly. In length from 8 to 18 m.m.; in pubescence, some being nearly naked and unicolored, others having it longer and condensed into spots or almost vittate; some being quite slender and elongate, while others are short and broad; the surface of the elytra is mostly uniform, but in some, especially such as are narrow and elongated, one or two costæ are more or less evident.

Now, although this account differs so widely from that given by Mr. Fitch, still the beetles are the same. Unfortunately I have never been able to find any pruned oak limbs from which to obtain the insect myself, but I have a good set from Mr. Blanchard, of Mass., presumably from the oak, which are identical. Through the kindness of Mr. F. Clarkson, I have a set of those described by him in the CAN. ENT., vol. 17, p. 188, from oak limbs, and which became imagos in November, and there is no perceptible difference. Dr. Geo. H. Horn says, "they are the same."

To identify *Elaphidion parallelum* had always been a puzzle to me, and I once thought I had a real set; I obtained it about a dozen times by exchange, but could never be satisfied that the specimens received were not pauperized, or peculiar individuals of *E. villosum*. On comparing my hickory insects with all the descriptions of *E. villosum* and *parallelum* and their several synonyms, as far as I possess them, it was easy to pick out sets that would answer satisfactorily all their requirements, and I became satisfied that *E. parallelum* could not be separated.

An inquiry of Dr. Geo. H. Horn elicits the following note and kind permission to use it:

"Regarding the two species of *Elaphidion (villosum* and *parallelum)* of which you write, I can only say that my opinion, based on the series in my cabinet and an examination of those in the cabinet of Dr. Leconte, is that they are inseparable. The slight differences, referred to by Dr. Leconte, in the last ventral segment of the males, are not real but dependent on the angle at which they are seen." The differences referred to are that in *E. villosum* the last ventral segment of the male is rounded, while in *parallelum* it is emarginate. The only other structural difference mentioned by Dr. Leconte is,

" Prothorax scarcely longer than wide—*villosum*.
" Prothorax distinctly longer than wide —*parallelum*."

From the insects before me from the hickory, it is easy to pick out some with the thorax fully one-fourth wider than long, and others with it one-fourth longer than wide, but they are brought together so insensibly by intermediates, that where the proper separation into species should begin it is impossible to decide. The same may be said of the differences in elongation, narrowness and pubescence; and I can find no basis for retaining *parallelum* as even a racial or varietal name.

I trust the foregoing may stimulate such as have opportunity to investigate the habits of this interesting beetle more thoroughly. I mention some of the points that require clearing up. First, the length of time occupied in the metamorphosis of such as breed in the branches of living trees One year is certainly an error, as it is opposed to the known history of any other Cerambycide having a similar habit. Second, whether the falling of the limb is not accidental, the majority containing larvæ not being weakened enough to break. Third, whether the end of the limb remaining on the tree does not contain the insect equally with that which falls—points that might be determined by cutting down a tree in autumn from which limbs had been pruned. Fourth, to make a collection for comparison from each species of tree infested.

Besides the accounts of Professor Peck, Fitch and Harris, the following bibliography may be noticed:

Haldeman—Trans. Am. Phil. Soc., vol. 10, p. 34.

Larva feeds on the living [?] wood of oak, hickory and chestnut; also dead Abies.

Riley—American Ent., vol. 2, p. 60; *ib.* vol. 3, p. 239.

Larva bores in plum and apple twigs, and in dry grape cane, Missouri Rep., 3, p. 6. Bores into and prunes the limbs of the apple. *Ib.* 4, p. 54. Bred abundantly from injured grape stems.

Rathvon—U. S. Agricultural Rep., 1861, p. 615.

Merely a synopsis of Fitch's account.

Packard, jr.—Bul., No. 7, p. 30. U. S. Entomological Commission. Scissored from Fitch in full.

Clarkson—Can. Ent., vol. 17, p. 188, and vol. 19, p. 31.

Discovers that the insect completes its metamorphosis in the fall and

early winter, in oak limbs, and takes issue with Peck, Fitch and Harris on several points.

Townsend, Can. Ent., vol. 18, p. 12.

Thinks Mr. Clarkson's discovery the exception, and not the rule, in the time of metamorphosis.

DESCRIPTIONS OF NEW SPECIES OF NORTH AMERICAN HETEROCERA, WITH NOTES.

BY HENRY EDWARDS.

FAM. ÆGERIADÆ.

FATUA PALMII, n. sp.

Allied to *F. denudata*, but differing greatly in important particulars. Fore wings are bright shining seal-brown, deep orange along the costa for the basal half. At the middle of the wing at base is a narrow denuded space, and the internal angle is also devoid of scales, but much more narrowly so than in *denudata*. The transparent space is golden yellow in shade. Lower wings transparent golden yellow, with very bright but dark opalescent reflection. The margin and spot at the extremity of cell dark brown. Antennæ bluish black, orange brown at the base. Head, disk of thorax, and the upper portion of the abdominal segments, black. Eyes black, palpi with black at their base. Front of head, collar, sides and base of thorax, posterior edges of abdominal segments bright orange. Feet and legs wholly orange without any black bands.

Exp. wings 45 m.m. Length of body 22 m.m 1 ♀. Enterprise, Florida. Taken by Mr. C. Palm, to whom I dedicate the species.

FAM. BOMBYCIDÆ.

LIMACODES BEUTENMUELLERI, n. sp.

Primaries rich chestnut brown, very glossy and mottled with blue metallic scales. Across the median space, and extending along internal margin to base is a deep fawn brown shade enclosing darker shades, and giving a clouded appearance to the wing. The apical part of the margin and the fringe pale fawn drab, passing into darker shade at the internal angle. Secondaries smoky brown, margins paler. Beneath

wings wholly smoky brown, with the apices pale. Head, thorax and abdomen chestnut brown. Exp. wings, 21 m.m. Length of body 9 m.m. Enterprise, Florida. 1 ♀.

I name this beautiful species after its discoverer, Mr. W. Beutenmueller, an earnest and talented entomologist, from whom good work in the future may be expected.

FAM. NOCTUIDÆ.

SCOTOGRAMMA STRETCHII, n. sp.

With much of the general appearance of *Perigea falsa*, Gr., but said by Mr. J. B. Smith to belong to his new genus *Scotogramma*. Dark stone drab, the lines blackish, all much confused, and the ground color of the wing covered with brownish irrorations. Basal half-line indistinct. T. a. line nearly straight, with a deep tooth anteriorly pointing towards the base. T. p. line dentated outwardly and joining the reniform in a darker cloud. Marginal line lost in a row of dark clouds. Intronervule spaces pointed with black lunules. The basal, median and submarginal spaces are pale by contrast with the dark lines. Lower wings dull stone drab, a little paler toward the base. Under side uniform stone drab, with very distinct darker discal spots and a median band common to both wings. Margins also dark. Thorax and abdomen concolorous. Exp. wings, 32 m.m. 1 ♀, 2 ♂. Colorado Desert. R. H. Stretch.

NOTES.

SPHINX CUPRESSI, Bdv.

It has been my good fortune to have the opportunity of examining two specimens (both ♂) of this very rare Sphinx, one taken by Mr. C. Palm, at Kissimmee, Florida, and the other by Mrs. Slosson, at Enterprise, Florida. I have no doubt whatever as to its being a very distinct species. Its color is pale fawn, with some whitish dashes over the primaries, and three brown streaks as indicated in Boisduval's figure. The lower wings are rich brown. Mr. Palm's specimen was taken in a cypress swamp, and Mrs. Slosson's at electric light. Both captures were made in May. It is probably an early insect, as the examples were somewhat rubbed.

PRIONEA LACERTULA, L.

This well-known European moth must be added to our fauna. A fresh specimen was taken by me in July, 1886, at St. John, N. B. I am

inclined to think that this species may be confounded in some collections with *P. bilineata*, examples of which from Nova Scotia are in my collection.

NOTE ON THECLA AUGUSTUS.

BY REV. THOMAS W. FYLES, SOUTH QUEBEC.

I beg to record the capture, by myself, in the neighborhood of Bergerville, Province of Quebec, of two specimens of *Thecla Augustus*. One of them was taken on the 6th, and the other on the 8th of June. I am indebted to Mr. W. H. Edwards for the identification of the insects.

A figure of *Thecla Augustus* is given by Harris in his work on insects injurious to vegetation, page 279. As he gives no description of the insect, the following may not be unwelcome to some of the readers of the CANADIAN ENTOMOLOGIST:—

Expanse of wings 1 inch. Colour above, umber-brown, darker along the costa, and at the base in fore-wings. At the centre, in the fore-wings, there is a rust-red tinge or blush; and at the anal angle in the hind-wings there is an indistinct spot of the same color. The under-side of the fore-wings is of a lighter shade than the upper. Beyond the centre of the wing is a wavy transverse dark line. The hind-wings on the under-side have a basal patch of dark umber irregularly bordered. The antennæ are ringed black and white.

STRAY NOTES ON MYRMELEONIDÆ, PART 2.

BY DR. H. A. HAGEN, CAMBRIDGE, MASS.

(Continued from page 136.)

3. *Acanthaclisis Texana* Hagen.

I have a male and two females from Carrizo Spring, Dimmit Co., Western Texas, just near the frontier of Mexico.

Length of body, male, with app., 50 m.m.; female, 45. Length with wings, 65 m.m. Exp. al., 118 to 120.

Very similar in shape and color to *A. Americana*. After long consideration I believe them to be different species, until by a larger material

it shall be shown that the differences given are such that *A. Texana* should be considered to be only a well marked variety.

The differences are :—

1. The vertex is rounded, convex above and before, very slightly depressed longitudinally in the middle. The vertex of *Americana* is strongly flattened above, and cut off sharply anteriorly.

2. The last joint of labial palpi is more thickened, the suddenly coarctate tip shorter and truncate on the extreme apex. The same joint of *Americana* is less thickened, the tip longer and pointed.

3. The prothorax is a little shorter, equally broad in front and near the mesothorax. In *Americana* the prothorax is visibly narrowed before, so that its breadth near the head is only a little more than half its breadth near the mesothorax. I consider the structural differences of the head, thorax and wings important, and was indeed induced only by them to separate the two species. The difference of the spots on the wings is less important, the more so as I have noted, Stett. Ent. Z., xix., p. 124, a specimen of *A. occitanica* from Russia with similar spotted wings as in *Americana*.

4. All wings are sharper pointed, the hind wings are narrower, and the apex more falcate. The wings are less spotted ; the space between fourth and fifth vein is without spots, the space between subcosta and radius nearly spotless ; the hind wings less spotted.

5. The color of the body below is yellow, the legs nearly yellow ; the abdomen above yellow with a longitudinal brown band, divided in the median line ; on each side a lateral dark band ; the segments 5 to 7 with a small yellow dot on each side nearer to the base. The appendages of the male are short, 3 m.m. long, cylindrical, straight, rounded on tip, with black hairs.

4. *Acanthaclisis fallax* Rbr.

I am not able to give now an exact and sure opinion of this species, as my 12 specimens were destroyed in bringing over my collection. Of these, seven males were from Brazil and Guiana (*M. senilis* Klug, still present in the Berlin Museum), and from California. I had provisionally separated five of these from Cuba and Venezuela (not described) as *M. Cubana, mihi.* But I have described them all later as *A. fallax* Rbr. (type compared) and *A. impostor* Walk. (type compared) in my Synopsis of Neuropt. of N. America, p. 223, No. 2. Only two specimens in very

bad condition are now before me, from Mungruba, Ceara, N. E. Brazil, and from the Isthmus of Tehuantepec, Mex., coll. by Prof. Suamichrast. A figure, which has been overlooked, is given (1742) in Reaumur, Mem., vol. 6, pl. 34, f. 15, and only mentioned, p. 386, as received from Hayti by Mr. DuHamel. The figure, a male, is bad, but represents very probably the same species.

The wings of *A. fallax* are much paler, less spotted, or not at all. Otherwise, if my memory is right, they agree with *A. Texana*, at least some small differences in Rambur's and Walker's descriptions seem to be not important. If so, *A. Texana* would be only a northern, stronger colored form of *A. fallax*.

Though I have tried to separate carefully *A. Americana* from *A. Texana*, the assumption that the first species may represent only a more northern and strongly marked form of the latter one is very inviting. Nevertheless I have before me the raised larva of *A. Americana* from Florida, and the supposed larva of *A. fallax* from Victoria, Brazil. Both seem to me different, and until now no other Brazilian species is known.

5. *Previous Stages of Acanthaclisis Americana.*

Larva full grown Head oblong, broad, the base covered by the prothorax; a little longer than broad, above flattened, below slightly convex; sides a little curvate, so that the base is narrowed; front margin notched; labrum nearly as broad as the head, on each side covering as a narrow lobe the base of mandibles; front margin with black bristles; eye-cone with six ocelli, and a seventh below the others among black bristles; antennæ short, thin, with annulated joints, and a longer, cylindrical apical one; mandibles as long as the head, black, powerful; basal half dilated with three oblique strong teeth, separated, the basal one a little shorter; apical half curvated, pointed; no interior bristles; head above with short hairs, directed to the front, on sides and below more numerous; labial palpi short, two cylindrical small basal joints; apical as long as both together, thicker, above triangularly dilated.

Prothorax a little broader than head, above globose; hind segment short with two stigmata; the other parts ovoid, half as broad as long; mesothorax broadest; scars as commonly; first abdominal segment with a dorsal stigma, the following ones lateral: the segments with short black lateral brushes; abdomen above with black hairs on the transversal folds; last segment round, transversally split with numerous black thorns and

hairs. Legs moderately long and thick, the claws a little incurvate on tip; hind legs shorter; claws short, strong, pyramidal. Color yellowish gray; head above with two black bands, enlarged before, and on each side an incurved black line, touching the front corner of the band and going behind to the lateral margin; before the bands two angular spots; lateral margin dark; head below blackish brown on the middle of front margin, and on the sides below the eye-cones yellowish; on each side of the base brownish, less dark; prothorax with two blackish longitudinal bands, broader anteriorly; basal segment with two angular spots; abdomen above gray, checkered with black; two black bands on each side are interrupted to form square black spots; below the abdomen is more yellowish at base, with angular black spots between the legs, which are pale yellow.

Long., 23 m.m.; lat., 10 m.m.

Comparing this larva with those supposed to belong to *A. fallax* (Stett Ent. Z., 1873, p. 266), there can be no doubt that they belong to different species. Those of *A. fallax* are longer, more slender, the head narrower, longer, the lateral margins of abdomen with long black brushes, the teeth of mandibles different, and the part of the mandible in which they are inserted more inflated; besides the colors are different.

The larva of *A. Americana* is in shape, form and color more like that of *A. occitanica*, but the teeth of the latter are more like those of *fallax*.

The shed larva skin of *Americana*, 12 m.m. long, is before me; also the cocoon, 20 m.m in diameter, externally covered with sand.

A nymph just hatched, 26 m.m. long, is still partly in the skin; the mandibles are just as broad and just as serrated as Brauer figures them for *A. occitanica*. In fact all stages are so similar that it is difficult to believe them to belong to different genera.

Habitat.—Mr. H. G. Hubbard, to whom I am indebted for this valuable discovery, writes as follows: "The *Acanthaclisis Americana* I bred from the larva. One died in quitting the cocoon. I never saw the imago until I bred it, so it must be very rare in Florida. The larvæ I found in dry sand under a building in Crescent City, Florida. They do not make pits, but they prey upon the common pit-fall making Myrmeleon larvæ. These they chase under the sand, as fish pursue their prey under water. I found that in confinement they would not eat anything which remained on top of the sand, nor which I purposely buried for them. But they

captured and ate as many larvæ of Myrmeleon as I had time to procure for them."

6. *Larva.*

Together with the two larvæ of *A. Americana*, Mr. Hubbard sent a very similar but a little smaller one from the same locality.

The larva is of much brighter colors, long. 17 m.m., broad 7 m m., and is similar to *A. Americana*, but with only one tooth on the mandibles. This is so entirely exceptional for Myrmeleon and Ascalaphus (only *Suphalasca Dietrichiæ*, Brauer, is known with one tooth), that at first I supposed it to be a deformity. Nevertheless both mandibles are entirely alike, and no trace of any deformity is to be seen. The mandibles are reddish-brown, shorter than in *Americana*, and less incurved; internally after the third basal part a strong, oblique, conical tooth, much longer and larger than the basal tooth of *A. Americana;* there are no bristles, but the inner margin of the mandible goes behind the tooth, sloping to the tip. The eye-cone is lower; antennæ with three basal joints longer, conical, followed by a few annulate short joints, the apical one larger ovoid. Head smaller; otherwise the whole larva, colors excepted, is entirely similar to *A. Americana.* The color is light yellow with a grayish tinge on thorax and abdomen; two black dots near the front of the head; prothorax on each side of the front margin with a transversal black band, notched behind; two large spots near the hind margin; mesothorax and metathorax on each side with a round black spot, divided by a yellow line; abdomen above with two black interrupted bands, formed by a square spot on each segment; a strong black brush directed anteriorly on the side margin of segments; the under side and legs are uniformly yellow; head with a black anterior margin; last segment as in *Americana.*

I can not say more about this curious larva. Mr. Hubbard writes me that it was collected in the same place with the others, but that he had not remarked the difference of the mandibles. Perhaps he will be able to solve the mystery.

7. *Acanthaclisis occitanica*, Vill.

The life history of this species is very well described by Professor Brauer; all stages are before me. It was known long ago that among the species of Acanthaclisis in America, Africa, Asia and perhaps Australia, a certain number have not the spurs broken in a right angle suddenly, and the basal part dilated as in the type. Rambur is supposed to

have chosen the name of the genus for this character, though I am not aware that he ever had mentioned it: the derivation is given in Agassiz Nomenclator. The other species have the spurs subuliform, more or less incurvated. This character is indeed very obvious, and so it has been several times stated that probably the species with subuliform spurs could form a different genus. Mr. Redtenbacher, 1884, remarks that I had not stated whether the larva of *A. fallax* had bristles between the teeth of the mandibles or not. Now *A. fallax* has no bristles, and therefore they were not mentioned by me. But I was not then aware of the importance of this character, otherwise I should have mentioned their absence. The splendid figures of all my larvæ drawn by Mr. Konopicki, Vienna, I have not yet been able to publish.

The question whether *Acanthaclisis* has to be divided or not, was studied by me carefully. The previous stages of *Americana*, the first species known with unbroken spurs, except for the entire absence of bristles between the teeth of the mandibles, seem not to favor a division. I am until now not able to find differences in the characters, except the negative one in the larva, and the positive one in the imago. But I think in *Chrysopa* and its allied forms similar differences exist. The third N. American species, my *A. congener*, has broken spurs similar to those of *occitanica*, and my presumed larva (Mr. Redtenbacher supposes it to belong to *Macronemurus*) has bristles on the inner margin of the mandibles.

Mr. McLachlan, Ent. M. Mag., vol. xx., p. 183, says of *A. occitanica*: "Introduced in Prussia." If his statement is not based on new facts or observations unknown to me, I believe that a perusal of the statements given in Stett. Ent. Zeit., vol. xix., p. 124, and vol. xx., p. 431, will not warrant us to consider the species as introduced in Prussia. It is true that the species found through seven years in Kahlberg, Prussia, is not recorded for the whole region between Prussia and Hungary, or beyond the Alps. But I may remark that *A. Americana* is not recorded for the larger distance from Sandy Hook, New York, to the south of N. Carolina. It is believed that a number of insects of the southern species, even of Florida, are to be found in S. Massachusetts, Martha's Vineyard, Nantucket, as a consequence of the warmer temperature of the Gulf Stream; I am assured of the same fact for Sandy Hook. There is perhaps another explanation of the fact that *A. Americana* has not been yet discovered between New York and N. Carolina. Those large *Acanthaclisis* belong to the most sluggish insects known. For the European species I can

speak from my own experience, which is fully corroborated for the American species by two entomologists here. In Kahlberg, Mr. Schindofsky came to show me the insect in the field, and told me he was sure I would pass by it without seeing it. On a rustic fence I really passed it; the specimen had been sitting on the same place at least for two hours, and matched perfectly with the color of the bark of the fence rail I threw it in the air to see it fly. It fluttered in the most lazy and awkward manner, until it tumbled in a potato field very near; when I took it up again, without any resistance on its part, the same show was experienced. Perhaps they are more agile during the night. The not uncommon presence of the insect in the same place was observed during the last seven years before I left Europe. As later, by order of the Government, a country road was laid just through the sandy hill where the insect lived, it may have been destroyed, but I have had no information about it. As I have been connected most intimately since the first discovery of this species in Prussia, with the question, "introduced or not," I beg leave to give my objections to the statement that it is introduced, which seems to be an impossibility.

The following interesting species of an Ascalaphide, described by me many years ago, but not yet published, has the same distribution as *Acanthaclisis Americana*, going even further to the north.

8. *Colobopterus excisus* Hagen.

Male. Eyes globose, very large, separated above by a narrow, hollowed, dark brown furrow; front dark brown, along the inner border of the eyes pale; near the antennæ with long grayish hairs; each side above the labrum with dense whitish hairs: labrum yellowish; palpi shining, blackish-brown, joints paler on tip, which has black hairs around, except the apical joint; labium yellow. Eyes blackish-brown behind; antennæ a little shorter than front wings, blackish, base with grayish hairs, club large, ovoid, the joints above and below with white transversal lines. Thorax dark brown with two yellow spots and brown villosity above: besides gray hairs. Abdomen a little longer than the wings, basal half a little enlarged; black, segments 2nd to 4th with a long black velvety band on each side of the apical half; surrounded by yellow, which covers the basal half, and is separated only narrowly in the middle: segment 2 with a dorsal brush of erected black hairs in the middle, where the velvety bands begin; the three last segments yellowish on tip: last segment covering two oblique appendages, the tip somewhat inflated, yellowish: those

parts are not well visible. Legs short, black, very hairy; spurs as long as four tarsal joints. Wings hyaline, veins brown; extreme base of all brownish; pterostigma yellowish; hind wings on the basal third of the hind margin with a deep semi-circular excision, reaching the longitudinal veins; front wings with a very flat notch on the base.

Long. of body 34 to 38 m.m.; long. of abdomen 25 to 31 m.m.; long. antennae 26 m.m.; exp. al. 64 m.m. Lat. of hind wings, 7 m.m.; on the notch, 3 m.m.

Hab.—A male from Florida, by Uhler; a male from Cumberland Gap, Ky.; a male from New Haven, Conn., by E. Harrison; a male from Falmouth, Mass., July 22; a male from Middleboro, Mass.; besides I have seen some fresh specimens collected by B. P. Mann in June, in Martha's Vineyard. The distribution from Florida to Martha's Vineyard Isl. is very large. This species is until now the only one known from the U. S.

I have before me a sketch of a young larva of an Ascalaphide, made more than a dozen years ago, which was shown to me by Mr. Riley; perhaps it belongs to this species, at least it differs from all larvae known.

9. *Acanthaclisis congener* Hag.

Synops. N. Am. Neuroptera, p. 224, No. 3.

Black with gray villosity; face, palpi and base of the antennæ beneath yellowish white; antennæ short, stout, black, faintly annulated with yellow, more visible on the apex; maxillary palpi yellow, slender, cylindrical; labial palpi longer, stronger yellow, last joint with short black hairs, inflated before the sudden coarctated pyramidal tip; on the inflation an external impressed longitudinal narrow band; vertex black with two anterior transversal bands, the posterior one incomplete, interrupted in the middle, and two dots posterior to the bands, all yellow; prothorax quadrangular, a little broader near the thorax, front margin about straight; black, with some whitish villosity; some tufts of black hairs on each side; a maculose stripe on each side and two middle spots yellow; posterior margin fulvous, black in the middle; mesothorax black, covered with whitish villosity; two spots on the front margin, then six in a series, the intermediate ones triangular, and two posterior, all yellow; some not well defined below the wings. Abdomen black with gray pile, more dense at the base; posterior margin of segments pale yellowish; segments 5 and 6 of males with a large triangular apical spot, which is bifid on the 5th segment; last segment short, black; male appendages very hairy, light

brown, twice as long as last segment, basal half thicker, with a knee below, apical half cylindrical, rounded on tip, with a brush of black hairs below; seen from besides the basal half is triangular, going downward, the apical half straight horizontal. Abdomen of female a little shorter and thicker; last segment below with black hairs, and split in the middle; on each side with a yellow cylindrical appendage as long as segments; legs short, hairy, fuscous; tibiæ yellowish, annulated with black, or sometimes black annulated with yellow; spurs brown, dilated, the tip broken down suddenly in a right angle; tarsi black, apical joint yellow; claws brown, incurved. Wings hyaline, a little acuminate, veins and veinlets alternately yellow and black; pterostigma small, indistinct, blackish; costal space with one series of areoles; hind wings a little shorter, veins not so much spotted; the males at base with a small yellowish pelote.

Long. of body, 36 to 38 m.m.; exp. alar., 70 to 80 m.m.

Hab.—The types (now destroyed) were four females from Pecos River, Western Texas (now N. Mexico), collected in July on Capt. Pope's Expedition; one specimen of the same lot is still present in Mr. Uhler's coll. I have now before me a dozen specimens, half females, one from Oregon by Mr. H. Edwards, and all others from Ainsworth, Wash. Terr., July 20, coll. by Mr. S. Henshaw. Ainsworth, a town, then only a few months old, is situated in the middle of a sandy desert just near the Columbia River and mouth of Snake River. The little inn where we had to stay showed the windows and window-sills covered with Myrmeleons, all of a very sluggish temper. *A. congener* was common. One male was collected the day before, July 19, on the Big Bend of the Yakima River.

About the supposed larva of this species described by me long ago, I have to speak later.

The species of *Acanthaclisis* described here are the only ones known to exist in N. America.

10. *Myrmeleon gulo* Burm.

The type of Burmeister, vol. ii., p. 997, No. 18, from Senegambia, in Winthem's collection, has been carefully compared by me. Burmeister quotes *M. gulo* Dalman, Analecta., p. 89, No. 101, but neither the label nor the description give any surety that the specimen had been sent by Dalman as his type, the more so as this is stated for the following species in Burm. Handb., *M. Hyaena*. The type of the latter is now with

Schoenherr's collection in the Stockholm Museum. Indeed the identity of Burmeister's *M. gulo* with this of Dalman is rather doubtful, as the following characters of Dalman's description are wanting in Burmeister's specimen :

1. *Niger*—alis *fuscescentibus—nigro strigosis.*
2. Collare—*nigropilosum.*
3. Thorax supra—*immaculatus.*
4. Pedes—*immaculati.*
5. Alar. confertim *reticulatæ;* stigmata *fusco;* punctum *fuscum* medium ante apicem.

As Burmeister's *M. gulo* is apparently *Acanthaclisis distincta* Rbr., we may retain this name.

11. *Myrmeleon nigrum* Linn.

Among Linnæus's papers were found the descriptions of some species which were published by Afzelius in Linnæus's autograph annotations, p. 138, No. 14. The same was re-published, 1832, by Fee, in the Life of Linn , Mém. Soc. Sc. Lille, p. 365 :

Myrmeleon nigrum.—Alis medio fascia posticeque maculis albis. Hab., Africa, Fothergill. Corpus Myrm. formicarii sed alae latiores, et totum nigrum. Antennæ setaceæ. Alae nigræ concolores ; fascia alba lineari interrupta in medio, sed postice maculis albis plurimis majoribus magis sparsis.

I am not aware that the species is mentioned by later entomologists. I do not know where it belongs.

THE CLASSIFICATION OF THE BOMBYCIDÆ.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

Notwithstanding much that has been learnedly written upon the family Bombycidæ, or Spinner Moths, no strong exclusive structural characters have been brought to light which hold the groups together as a natural family. Following Linné and Latreille, the American authors, Dr. Harris and Dr. Packard, have, however, considered such a family to exist. In Germany the different groups, or sub-families, have been raised to the rank of families, while under the loose term Bombyces the Spinner Moths as a whole have been designated. In this paper the

American tradition is followed, and the nomenclature adapted to this classificatory view. The *Bombycidæ* are characterized as a whole by their ample wings and sluggish habit. The head is small and the oval structure generally weak and undeveloped. The antennæ are short, rather than long, and oftenest pectinated in the male sex. The pieces of which the thorax is composed present a somewhat different proportion, as compared with other families of moths, and the thorax appears shorter and also more elevated dorsally. The legs are weak; the abdomen cylindrical, untufted as a rule, and not exceeding the hind wings. The habit of cocoon-making is carried to its greatest development in certain groups, but the American sub-family *Ceratocampinæ* makes no cocoon, the pupa lying naked in the ground. The strong characters which mark certain sub-families, such as the *Hepialinæ*, in the neuration and thoracic structure, at first sight seem of family rank, but the general *form*, which must decide the question, according to Agassiz, enables us to consider all these groups as interrelated and as the survivors of a former complex in which there were fewer gaps. The arrangement of these groups in a linear series must proceed according to our ideas of rank, and in this case it cannot be doubted that the *Hepialinæ* are the lowest. The classification of Harris is thus apparently more philosophic than that of v. Hainemann and Speyer.

I have only differed from Dr. Packard in eliminating the *Hemileucinæ*, and in separating the *Cossinæ* and *Hepialinæ;* further, I have placed the genus *Crocata* among the *Arctiinæ;* I have also rejected Packard's genus *Platycerura* as not allied to *Cerura*, but as probably an Apateloid form. If we do not include this genus among the higher Owlet Moths, it must find a place beside *Dasychira*. The moth itself was one of my own earliest discoveries. I kept back from describing it on hearing that it was to be published in the well-known Synopsis of the family which shortly after appeared in the Proceedings of the Entomological Society of Philadelphia.

The different sub-families of the *Bombycidæ* show resemblances to other families of moths: The *Arctiinæ* are with difficulty to be separated from the lower *Zygænidæ;* the *Psychiinæ* run close to certain *Tineidæ;* the *Notodontinæ* resemble the *Noctuidæ;* the *Ceratocampinæ* the *Sphingidæ;* the *Cochliopodinæ* the *Tortricidæ;* the *Platypterygiuæ* the *Geometridæ*. The *Cossinæ* and *Hepialinæ* are internal feeders in the larval state, and thus resemble the *Ægeriidæ*. Dr. Packard has most inter-

estingly shown that the *Neuroptera* afford a synthetic type among the orders of insects, and also how the *Hepialinæ* are related to this order by their long thorax, the sub-equal wings, the unusual number of veins, their distance at base, being nearly set on a plane, as the wings of dragon-flies. So, among the moths themselves, the Spinners occupy a central and synthethic position, having resemblances to all the other moths, and probably containing very old types of *Lepidoptera*.

The caterpillars are usually hairy or provided with warts and bristles, but not a few are naked and sphingiform, as that of *Notodonta stragula*. Probably one of the most remarkable known lepidopterous larvæ, that of the European *Stauropus fagi*, occurs in this family. This brown caterpillar is called "the lobster" by collectors from its odd shape: the thoracic feet are abnormally developed. The moth is not unlike our genus *Heterocampa* and is sufficiently commonplace. Walker mistakenly credits North America with species of this genus.

The sub-family *Nycteolinæ*, of which *Nola* is the type, and which is characterized by the weak bushy palpi, while the white and grey moths look like minute *Noctuidæ (Eustrotia)*, is represented in North America by the genera *Nola*, *Argyrophyes* and *Sarothripus*. The palpi exceed the head, and are somewhat flattened. The second sub-family, or *Lithosiinæ*, is characterized by the absence of simple eyes, or ocelli, and narrow wings, while most of the genera are, like the Bryophilians, lichen feeding The genus *Crocota* is wrongly included here by Dr. Packard. Prof. Saunders describes the larva of *C. quinaria* under the name of *Arctia bimacula*, and it is quite clear that this frail genus is to be classed under the sub-family *Arctiinæ*.

In the present brief paper I only direct attention to the position of the sub-family *Hemileucinæ*. In this sub-family, which I separated from the *Attacinæ* (=Saturnidæ of Authors), the mature larva is provided with short bristles arising in fascicles, and thus in the mature larval stage resembles the young larva of the *Attacinæ* on leaving the egg, such as that of *Platysamia cecropia*. The cocoon is not free and spun in the leaves and branches, but on the ground, amid *debris* and mixed with sand and soil. The perfect insect has the antennæ less lengthily pectinate, as compared with the *Attacinæ*, and the broad wings are no longer falcate. We have to do with a type intermediate between the *Attacinæ* and *Ceratocampinæ*. The genera are *Pseudohazis*, *Hemileuca*, *Argyrauges*, *Coloradia* and *Hyperchiria*. *Hemileuca* contains species so closely

allied that it is evident we have to do with one of the kind I have called *Progenera*, of which *Datana* is so conspicuous an example. The moth *H. tricolor* Grote, ex Pack., is, however, a true *Hemileuca*. The characters of this genus, the black antennæ, the red body tufts, are retained in this faded moth, which has been cited by Dr. Packard as owing its color to its peculiar environment. The genus and species *Argyrauges Neumoegeni* Grote, ex Hy. Edwards, is closely allied, but here the antennæ are yellowish and comparative differences allow us to concede a new generic type. The relationship is evidenced by the red tufts still, but the pattern, not the color, has also undergone a modification. It is quite clear that the genus *Euleucophæus* has been misapplied by Henry Edwards and Mr. Neumoegen. I have not seen the insects described by these writers, but they must be referred to a different genus, since *Euleucophæus*, with its type *tricolor*, has no standing. They may be allied to *Coloradia*.

The sub-family *Ceratocampinæ* is first eliminated by Dr. Harris. It appears to me to be exclusively North American, and even to be confined to the wider region east of the Rocky Mountains, the Sierras and Cordilleras and Andes of America, the rocky back bone of the whole continent. Among our *Attacinae*, the two species of *Saturnia* are most interesting, both because they belong to this European genus, and because they illustrate what I have pointed out among the lower moths, a certain affinity between the faunas of Texas and California, not apparent in the Lepidoptera of the Middle States.

SOME EUROPEAN BEETLES IN AMERICA.

BY SAMUEL HENSHAW, BOSTON, MASS.

On page 114 of the present volume of the CANADIAN ENTOMOLOGIST Mr. A. R. Grote in his "Note on Mistaken Identifications," mentions Dr. Harris's record of the capture of *Carabus auratus* Linn., in Massachusetts, and implies that Dr. Harris has made an erroneous, or "curious," identification. This, however, is not the case, and it would be impossible for so careful an observer as Dr. Harris to make a mistake about a species so well known.

The specimen referred to is preserved in the Harris collection, and, so far as I know, is the only one on record captured in the United States.

In the catalogue of the Harris collection we read : " 2. *Carabus auratus* L. In Dr. Holbrook's garden, 1819. Undoubtedly introduced in balls of earth surrounding the roots of French trees."

Dr. Leconte (Ann. Lyc. 1848, vol. iv., p. 159–160,) also mentions this occurrence of *C. auratus* in the United States, and assigns the same method of dispersion. This record of *C. auratus* recalls the case of another common European beetle found once in Eastern Massachusetts, but which has failed to become established. In the Proc. Bost. Soc. Nat. Hist., 1869, vol. xii., p. 381, Mr. Ernest Papendiek notes the capture in Milton, Mass., of twenty specimens of *Silpha atrata*.

In 1844, Dr. F. E. Melsheimer described as new *Onthophagus rhinoceros* and *Aphodius pensvallensis;* subsequent study, however, proved *O. rhinoceros* synonymous with *O. nuchicornis*, and *A. pensvallensis* the same as *A. erraticus*, both well known European species. Drs. Haldeman and Leconte in a foot note to the Melsheimer catalogue doubted the occurrence of both species " unless introduced by accident," and it is only quite recently that we have been able to add both species to our lists. Mr. Otto Lugger reports *A. erraticus* as abundant in Maryland, and in June, 1881, when collecting on several of the Magdalen Islands in the Gulf of St. Lawrence, I found *O. nuchicornis* abundant in cattle droppings. As I have since seen specimens from New Brunswick and Rhode Island, the species is probably established in this country.

On some future occasion it will be interesting to note the species erroneously accredited to the fauna of North America, together with those common to America and the eastern hemisphere.

Report of the Select Standing Committee on Immigration and Colonization of the House of Commons, Ottawa, 1886.

In this " Blue Book " we find some valuable information on injurious insects given to the Committee by our friend Mr. James Fletcher, who is doing much good work in Economic Entomology in connection with the Dominion Department of Agriculture. It must be evident to the Department, we should think, by this time that Mr. Fletcher's services are of so much value to the country that they should be no longer of a purely " honorary " character, but should be regarded in the same light as those of Prof. Riley at Washington, Dr. Lintner at Albany, Prof. Forbes in Illinois, and many others in various States of the Union.

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SOME NORTH AMERICAN TACHINÆ.

BY BARON OSTEN SACKEN.

[The following paper was left by Baron Osten Sacken [O. S. had left Washington on Embassy about ten years earlier], with his collection of Diptera, in the charge of Dr. H. A. Hagen, of the Museum of Comparative Zoology, Cambridge, Mass., by whom it has been sent to us for publication. The description of the last species, *Tachina theclarum*, is by S. H. Scudder.—Ed. C. E.]

Tachina (Exorista) futilis Say., MSS. ♂, ♀. Palpi, antennæ and legs black; face, front and last abdominal segment with a brassy-yellow reflection. Length, 7–10 m.m.

Bottom of the antennal foveæ silvery gray; the lower part of the cheeks likewise; front, lateral parts of the face and the orbit of the eyes below and behind (genal and occipital orbit) brassy-yellowish, the coloring of the front being of a more saturate yellow than the lateral parts of the face; above the antennæ, in the middle of the front, a brown stripe, attenuated posteriorly; it bifurcates on the vertex, enclosing the grayish ocellar triangle; the hind plane of the head (occiput) gray. The row of frontal bristles consists: 1st, of three bristles pointing backwards, the uppermost of which is placed on the top of the vertex; 2nd, of three shorter bristles pointing forward; 3rd, of four or five bristles which form diverging rows, descending on both sides of the antennæ, the last being a little below the end of the second antennal joint. Between the frontal bristles and the eyes, the front bears numerous little hairs; between these rows on the ocellar triangle is the usual pair of bristles pointing forwards. The females have three supernumerary pairs of larger bristles; the first is placed behind the upper corner of the eye, the two others between the frontal row and the orbit of the eye. Among the above described smaller hairs, immediately below the last bristle, the brassy-yellow color of the face shows a brown, changing spot, visible in an oblique light only; below this place, the lateral parts of the face are smooth; a short distance above the oral margin there is, on each side, the usual long bristle; above it, some shorter hairs reach to about one-quarter of the

distance between the long bristle and the root of the antennæ. Antennæ black; second joint with a grayish pollen, and with a crest of short, stiff bristles; third joint long, with parallel sides, more than three times the length of the second, not quite reaching the edge of the mouth. Eyes distinctly pubescent.

Ground color of the thorax bluish black, almost concealed by five stripes of gray pollen, with intermediate black lines; the gray stripes are especially apparent when viewed obliquely from the posterior end of the body; in this light the median stripe appears bifurcate posteriorly; the next pair abbreviated posteriorly; the lateral pair very broad anteriorly, over the humeri. Scutellum bluish-black, with gray pollinose reflections; its tip faintly brownish; on the hind edge there are six bristles, the intermediate pair being the shortest; above this pair, on the plane of the scutellum, another similar pair. Pleuræ, grayish pollinose.

Abdomen black, marmorate with silvery gray; the fourth segment brassy-yellow. The whole abdomen is covered with dense short hairs; a pair of longer bristles near the hind margin of the first and second segments; a row of such bristles on the hind margin of the third segment, and a double row at the end of the fourth. Legs black; pulvilli brown; knees slightly brownish.

Wings: the first posterior cell open (closed by the prolongation of the costal vein, however, which nearly reaches the apex of the wing); the distance between the tips of the second and third veins is a little longer than that between the third vein and the apex of the wing; the elbow of the fourth vein without stump of a vein (a very minute one in one of the specimens); the great cross vein oblique, parallel to the last section of the fourth vein; small cross vein (in most specimens) opposite to about the middle of the distance between the tips of the auxiliary and first veins.

Bred from *Vanessa atalanta* (T. W. Harris and S. H. Scudder). Numerous specimens.

Tachina (Exorista) blanda, n. sp. ♂. Gray, thorax with four black stripes, the lateral ones broken in the middle; palpi and legs reddish; second and third abdominal segments with an additional pair of macrochetæ in the middle. Length 7 m.m.

Distribution of the frontal bristles as in *E. futilis* ♂, that is, on each side, beginning with the vertex, three longer bristles pointing backwards, three

shorter bristles before the antennæ, and three or four bristles descending on the face, alongside of the antennæ. On the ocellar triangle, a pair of bristles pointing forward. Between the row of frontal bristles and the eyes, a few scattered microscopic hairs; sides of the face bare. Front, face and posterior orbit silvery white. Frontal stripe brown, rather narrow, enclosing posteriorly the grayish ocellar triangle. Antennæ black slightly tinged with brownish red on the two first segments; the third segment is very long, almost reaching the edge of the mouth. Only a few short bristles above the usual long oral bristle. Palpi, reddish yellow. Eyes pubescent.

Thorax gray, with a slight yellowish tinge from an oblique point of view; two slightly divergent black lines do not reach beyond the middle; two lateral black stripes are interrupted at the suture and prolonged beyond it to the hind border; these lateral stripes are broadest in the middle and end in a point, anteriorly and posteriorly. Scutellum gray; two pairs of large macrochetæ each side; a third intermediate, very small pair, on the apex.

Abdomen gray with, a slightly yellowish tinge, especially on the last segment; somewhat marmorate, with blackish crossbands on the hind margins of the segments, and a longitudinal blackish line; the crossbands appear more distinct and broader from an oblique point of view; the longitudinal line disappears when viewed sideways from above. A pair of macrochetæ on the hind margin of the first segment; two pairs on the second segment, one in the middle, the other on the hind margin; on the third segment, a pair in the middle, and the usual row on the hind margin; two rows on the fourth segment.

Legs: coxæ and femora reddish; tibiæ reddish-brown; tarsi brown. Pulvilli unusually large; ungues?

(The wings in the described specimen are injured.)

A single specimen, bred from *Cynthia cardui* (C. V. Riley.)

This species is like *E. futilis* in the distribution of the bristles on the front and in the structure of the antennæ. It differs in the presence of an additional pair of macrochetæ in the middle of the second and of the third abdominal segments; also in the comparative smallness of the intermediate pair of macrochetæ on the apex of the scutellum.

Tachina (Exorista) hirsuta n. sp. ♀. Palpi, antennæ and legs black. Length 7 m.m.

Distribution of the frontal bristles like that in *E. futilis* ♀; that is,

besides the usual row of bristles on the front, there is a second row of three bristles on each side, between the first row and the orbit of the eye; the upper bristle of this second row is placed near the upper corner of the eye, alongside of the upper bristle of the first row; the second and third bristles are inserted lower down on the front. The usual inner row of frontal bristles consists of three bristles on the vertex, pointing backwards, the upper one of which is the longest, and of six bristles below them, descending rather low on the face, considerably below the end of the second antennal joint. The pair of bristles on the ocellar triangle is present. Above the usual long bristle on each side of the oral border there is a row of small hairs, ascending along the ridge of the face, but not reaching the level of the lowest bristle of the frontal row. Antennæ black, third joint with parallel sides, broader than in *E. futilis* and *E. blanda*, but at the same time shorter, as it does not reach the oral border. First half of the arista remarkably stout; its basal joint long and distinct. Palpi dark brown or black. Face and front silvery; oral margin pale; frontal stripe brown; ocellar triangle blackish, grayish pollinose. Eyes pubescent. Thorax bluish-black, grayish-pollinose; two sub-parallel, soon interrupted, black stripes in the middle, and two less definite lateral stripes, black. Pleuræ black, with a light-grayish pollen. Scutellum black, grayish-pollinose, its hind margin yellowish; the two lateral pairs of macrochetæ rather long and strong; the intermediate one small; a pair of small macrochetæ on the disc. Abdomen black, marmorate, with grayish-silvery reflections, especially on the anterior borders of the segments; a pair of macrochetæ on the hind border of the first segment (I believe that I perceive them in my only specimen, although its abdomen is so much crowded against the scutellum that this character is not easily discernible); on the second segment, a pair of macrochetæ in the middle only; on the third, the usual row of macrochetæ along the hind border; on the fourth, a number of macrochetæ, giving it a bristly appearance; the smaller hairs of the abdomen are more erect, longer and bristle-like than in *E. futilis* or *E. blanda*. Feet black. Wings nearly as in *E. futilis*.

Bred from *Pieris rapæ* in April (Lintner).

Tachina deilephilæ, Riley MSS. ♀. Palpi yellowish; antennæ and legs black; face and front silvery; abdomen red on the sides; venter red. Length 7 m. m.

Face and front silvery, the latter with a blackish-brown stripe; ocellar

triangle enclosed in the bifurcation of this stripe; the remaining portion of the vertex blackish; the rows of frontal bristles, on both sides of the frontal stripe, are short and inconspicuous superiorly, and only of moderate length near the antennæ. Of the three uppermost pairs of long bristles pointing backwards, which exist on the vertex in *E. futilis*, only the upper one is present; the lowest bristle of the rows is nearly opposite the end of the second antennal joint; there are but a few very inconspicuous hairs on the lower part of the front, between these rows and the orbit; nearer to the vertex, these hairs become more dense; a bristle above the upper corner of the eye (corresponding to a similar bristle in *E. futilis* ♀,) is present; the pair of bristles pointing forward on the ocellar triangle is also extant. Below the bristles the face is smooth, with but a few almost microscopic hairs; a short distance from the oral margin, there is on each side, the usual long bristle, above it some shorter hairs do not reach very high on the face. Antennæ black somewhat reddish on the incisure between the second and third joints; third joint with parallel sides, much shorter than the corresponding joint of *E. futilis* and not reaching the edge of the mouth by about one half of its own length. Eyes distinctly pubescent; palpi yellowish.

Thorax black, with the usual five stripes of gray pollen on the dorsum; scutellum with a brownish tinge, grayish-pollinose; bristles placed as in *E. futilis*. Abdomen blackish in the middle, reddish on the sides and at the tip; the red on the second and third segments occupying as much of the breadth of the dorsum as the black; the fourth segment is red, with elongated blackish spot in the middle of its base; all the segments with silvery-gray reflections. A row of bristles along the posterior margin of the third and on the fourth segments; the pairs of longer bristles on the first and second segments, which exist in *E. futilis*, are wanting here. Venter red, densly clothed with black hairs. Venation of the wings as in *E. futilis;* but the costal vein is not prolonged beyond the tip of the fourth vein; the great cross vein is distinctly bisinuate.

Bred from *Deilephila lineata* (C. V. Riley).

Three specimens.

The presence of only a single pair of long bristles on the top of the vertex, pointing backwards, and the absence of the pairs of macrochetæ on the first and second abdominal segments, prove that this species belongs, if not to a different genus, at least to a different section of a genus than *E. futilis*.

Tachina theclarum, parasitic on No. 30 *(Thecla inorata)*. Mr. W. Saunders. From life. Length 5 m.m.

Back of head steel gray, covered with short blackish hairs; front pale or whitish slate color, with darker reflections and with a vertical broad, blackish, frontal band; on either side a slightly curving row, outwardly concave, of black, curving, tapering bristles, directed upward, extending down the front from the summit to below the base of the antennæ; outside of the middle of this row a pair of similar downward directed bristles; a pair of downward directed bristles near the middle of the summit. Antennæ dark slate color. Eyes rich brown, covered with exceedingly delicate, short, white pile.

Thorax above dark brown with a hoary bloom, covered by frequent, erect, short, black hairs, and infrequent, decumbent, backward directed, large, black, tapering bristles; metanotum edged broadly behind with reddish brown; thorax and abdomen beneath piceous; covered profusely with long black hairs. Abdomen above shining piceous, first joint immaculate, second and third, especially latter, silvery or nacreous at base, obscure in the middle, fading out posteriorly; fourth segment nacreous at extreme base only; all profusely covered with long black hairs; second segment with a pair of erect, slightly curving, very long and tapering subdorsal bristles at the posterior border; third segment bristling with a transverse row of similar bristles, a dozen or more in number.

Legs black; claws black; pulvilli pale or colorless; tongue testaceous; covered profusely at tip with rather long colorless hairs; labial palpi blackish-brown.

SOME NOTES ON THE GENUS COLIAS WHILST ALIVE IN THE IMAGO STATE.

(Being extracts from a paper read before the Entomological Society of Ontario, Oct. 20th, 1886.)

BY GAMBLE GEDDES, TORONTO.

The paper which I have prepared to read upon the genus *Colias* differs from any that I have consulted up to the present time, in that it treats principally of the habits of the different species during lifetime in the imago state.

During the last ten years gigantic strides have been made by lepidop-

terologists in breeding the different species of this perplexing family, and their efforts have been crowned with such success that only a few remain about which nothing is known of the primary stages. It is about the life habits in the perfect state of some of these that I propose to address you, and if my paper does no good, it certainly cannot do any harm, as you will see by the subjoined list of my captures of the different species of Coliadæ that I have a right to express an opinion in this particular direction. Every entomologist knows that the only true way of ascertaining *bona fide* species in any family of diurnals is by breeeding from the egg and noting the different stages of metamorphoses, and although so much has been accomplished in this genus *Colias* by enthusiastic collectors, yet a great deal remains, and where we have not the means at hand to watch the progress of an insect from its earliest stage, we must content ourselves with the appearance first, and next, the habits of the perfect examples that are thrown in our way.

The extreme difficulty of obtaining eggs and carrying or forwarding them from long distances is only too well known to active collectors in outlandish places in our vast Dominion, and my personal opinion has been, and is, that when I have captured what I know to be a rare or a doubtful female of any kind, the correct thing is to kill it and pack it safely in cotton wool and paper, and not to run the risk of attempting to take the eggs and breed the insects. The fact of keeping the insects alive in a box with the food-plant and travelling by stage or on horseback, as my principal journeys have been made, almost compels the insect to damage its wings, and to such an extent that it will be difficult to recognize.

By enclosing what I supposed to be the food-plant of the butterfly with the female, I have lost, on many occasions, specimens which I would like to possess now.

There are other risks to be run. The females may or may not lay eggs, and these eggs may or may not prove fertile, and the young larvæ may or may not live after they come to light (this I regret to say has been my great trouble), and in every event I have always regretted the fact that I had not killed and preserved the female.

One instance I may here give of the few specimens of *C. Elis* which I was fortunate enough to take. Of this species I did not take many examples, and I have always congratulated myself since upon the fact that the few I did take are now safe in the hands of our leading col-

lectors, who possess really good representative collections, and fine examples are to be seen in the National Museum of the Geological and Natural History Survey of Canada, at Ottawa.

The variations in the appearance of the live females in the Coliadæ are most puzzling, and were it not for the similarity in the flight of several distinct forms of the same species, I fully believe the nomenclature of this genus would be even larger to-day than it already is. I beg to call your attention, as an example, to *Colias Christina*, Edw.

The variations in size, in colour, and in the markings generally, are so great, that had not several of the numerous forms been actually taken *in coitu*, it would be hard to make a collector believe that they were one and the same species.

The females of *Col. Christina*, as far as my experience goes, may be better compared to common "ribbon grass" than any other diurnal I have come across—by which I mean to say, that as it is a difficult matter to find two blades of grass exactly alike, so it is with the females of *Col. Christina*. The shades run from a pale green (the colour of *Actias luna,)* to lemon colour, and from lemon colour to bright orange, and the discal spot on the primaries is almost obsolete in some, whilst in others great uneven blotches of black or dark brown appear. When I captured this species in very large numbers in 1883, whilst collecting for Mr. Henley Grose Smith, of England, I was passing through what is known as the Red Deer River country, about seventy miles from Calgary, in the North West Territories. I was quite under the impression that I had discovered a number of new species, and that I could on my return home include a large proportion of my entomological acquaintances in describing and naming after them these peculiar butterflies. Imagine my surprise, when after referring about twenty-five or thirty of these females to Mr. W. H. Edwards, they all came back labelled *Col. Christina*, ♀.

I now give a list of the different species of Colias with which I am tolerably familiar, having captured specimens of each myself:

C. Christina, Edw., including southern form *Astrea*, Edw.

♂ quick of flight, like *Eurytheme*, and difficult to capture; ♀ short flights and slow of movement in the air. (Mr. W. H. Edwards has already figured *Col. Christina* in his excellent work on the butterflies of North America, but I have since

heard from him with pleasure that he is going to give a number of varietal forms in the new volume now being published; the plates will be for the most part figured from examples captured by me in 1883-4.)

C. Scudderii, Reak.

♀ Slow of movement, like *Christina*, and easily captured.

C. Occidentalis, Scud, including southern form *Chrysomelas*, Hy. Edw.

A lively insect, only taken when the sun was hottest and the day brightest.

C. Edwardsii, Behr.

No notes taken.

C. Alexandra, Edw.

♂ very lively, short flights; ♀ not observed.

C. Eurytheme, Boisd.

Winter form *Ariadne*, Edw.

" *Keywaydin*, Edw.

All the different forms of this insect are the liveliest I came across in the North West Territories.

C. Hagenii, Edw.

Very like the above, and almost impossible to catch on the wing, from the zig-zag movement in flying, and its long flights, often flying high in the air. Was taken in 1886 by me, at Kakabeka Falls, Lake Superior.

C. Philodice, Godt.

C. Interior, Scud.

Apparently a lazy insect; easy of capture. Very few taken in 1883 and 1884.

C. Elis, Streck.

♀ has a remarkably short flight, dropping suddenly to the ground, getting itself entangled amongst the grass and foliage; not alighting, as most Coliads do, where they can be seen, on a leaf or on a flower.

C. Elis is a new species described by Mr. Herman Strecker, after my return from the Rocky Mountains, in 1884. At present nothing is definitely known about the male of this species, although two forms of the

female have been described—an orange and an albino. Until the males are obtained from the egg, or until some collector at the summit of the Rockies, or some other range of mountains, takes the male and female *in coitu*, the male will remain a matter of doubt.

My own humble opinion is this: If the female—albino variety—is *Elis*, as described by Mr. Stecker, the chances are that there will be lemon colored males as well as orange, and that these males were taken by me in 1884. There are other species of Colias that have both lemon colored and orange males—such as *C. Christina*—upon some of which not a vestige of orange can be discovered.

ON THE POSITION OF COLIAS HAGENII, Edw.

BY W. H. EDWARDS, COALBURGH, WEST VIRGINIA.

In Papilio, 3, 159, 1883, I described Colias Hagenii as a new species. I related that Mr. T. L. Mead had brought this butterfly from Colorado, in 1871, and that we both were then satisfied that it was not *Philodice;* that in the summer of 1883, Mr. H. W. Nash, at Pueblo, Col., had sent me some chrysalids of this form, and I noticed that the dorsum was marked by two longitudinal lines, which seemed to indicate sub-dorsal lines in the larva, and which are not present in the larva of *Philodice;* that I wrote Mr. Nash to observe as to that, and he soon replied that the larvae he then had on hand did show sub-dorsal lines such as are characteristic of many larvae of *Eurytheme;* that I had been unable to get live eggs from Pueblo subsequently that year, owing to the heat which destroyed them *en-route*, but that Mr. Nash had made observations on the ground, and sent on larvae in alcohol which showed broad sub-dorsal bands, that, he said, in life had had red running through them. That other larvae showed white sub-dorsal lines only, and still others had no trace of such bands or lines, any more than *Philodice*. All which was like *Eurytheme*, except that in that species the red was not within the band, but over it in broken bits; and also under the bands in *Eurytheme* were often black points. The larvae of *Eurytheme* in these varieties are figured in But. N. A., vol. 2, plate 21.

I did not at the time describe the species, but mentioned it as the form

common in the Rocky Mtns., from Colorado to British Am., which was between *Eurytheme* and *Philodice*.

In another paper in same volume of Papilio, p. 173, I said of *Hagenii*: "The color is yellow, lighter than is usual in *Philodice*, but varies in that respect, many being very green, and a large percentage, especially of the females, are not yellow, but of a peculiar shade, a sort of buff-yellow (better chrome-yellow), a shade not seen in *Philodice*. Considerably more than half the females, as reported by Mr. Nash, are of this buff-yellow, and the males frequently show more or less of it, and occasionally have a flush of orange. The markings of *Hagenii* resemble those of *Eurytheme* and *Philodice*, in the discal spots, the extra-discal points on both wings, the patch at outer angle, the shape of the black borders; but there is a closer resemblance in the borders of the females to *Eurytheme* than to *Philodice*, these being very wide, and on hind wings nearly reaching the cell, completely enclosing more or less definite yellow spots." I also repeated what Mr. Mead had said, after a season spent in Colorado, 1871, that "if there could be such a thing as a yellow *Eurytheme*, this was it."

From 1883 to the present time I have embraced every opportunity to get eggs of *Hagenii*, laid by the females in confinement, and as will be seen, have raised many broods. Now I will give the results.

1. On May 11, 1884, received eggs of the first brood of the year. (I say here that invariably the females that laid eggs have been sent with them). From these obtained, between June 8th and 15th, 14 butterflies, 10 males, 4 females, all *Hagenii*.

2. June 7, 1884, received eggs of second brood of the year. Result, between 6th and 9th July, 15 butterflies, all *Eurytheme*, 11 males, 4 females. Three of these females were albinos.

3. June 27, 1884, received eggs. Result, 12 butterflies, 8 of them *Hagenii*, 3 males, 5 females, 4 *Eurytheme*, females.

4. 29th August and 3rd Sept., 1884, received eggs. Result, 1st to 3rd Oct., 5 *Hagenii*, 2 males, 3 females.

5. This same year, 1884, I raised a brood of larvae from eggs of *Eurytheme* received 27th June. Result, 9 butterflies, 6 being *Eurytheme*, 3 males, 3 females, and 3 *Hagenii*, 2 males, 1 female.

6. 1885, May 18, received eggs of *Hagenii*. Result, 13th to 18th June, 35 butterflies, all *Hagenii*, 20 males, 15 females. The females of this brood were very large and most of them were deep colored.

7. 1886, 31st July, received eggs of *Hagenii*. Result, 28th to 30th August, 3 males, 2 females, all *Hagenii*.

8. 1887, 11th May, received eggs of *Hagenii*, the first brood of the year. Result, 9th to 14th June, 22 butterflies, all *Hagenii*, 15 males, 7 females.

9. 1887, 24th June, received eggs of *Hagenii*, the second brood of the year. Result, July 16th to 22nd, 16 butterflies, 3 males, 13 females, all *Hagenii*.

10. 1887, 5th July, received eggs of *Hagenii*, the second brood of the year. Result, July 27th to 29th, 18 butterflies, 17 being *Hagenii*, 14 males, 3 females; 1 *Eurytheme*, female.

So that I have bred nine broods from eggs of *Hagenii* and one from eggs of *Eurytheme*, and the result has sometimes been unmixed, all the imagos being of the form of the mother, at other times mixed, part *Eurytheme* and part *Hagenii*. There have been no examples which were doubtful; all were either distinctly one form or the other. None of the first brood of any year (1884, 1885, 1887) gave mixed results, all coming out *Hagenii*, from eggs of same. . But of the second brood of the year (eggs of *Hagenii* June, butterflies of July), the results were mixed. Of the later broods (imagos out in Sept. and Oct.), the result was *Hagenii* alone, but the examples in each of the late broods were too few to make the test satisfactory.

Therefore this species *Eurytheme*, heretofore known to manifest itself in three distinct forms, *Ariadne*, *Keewaydin* and *Eurytheme*, now becomes four-formed, *Hagenii* ranking with the others.

I have parted with none of these bred butterflies, and so am able to have them all before me as I write; and can state that: 1. There is a remarkable uniformity in the color of the males, and in the width of the marginal borders. The color is lemon-yellow. Every one of the June and July imagos has a broad border on each wing, and the outlines of inner side of same are essentially alike. Nearly all these outlines may be described as erose, and only two may be called dentated. As a rule, the borders of hind wings are black, while those of fore wings are densely dusted with yellow. Every male has an orange discal spot on hind wing. Now all this is very unlike *Philodice*, in which species there is no end of variety in color, in width of borders and their inner outline, and in the color of discal spot.

As to the females, there is not one of the June and July broods but has a very broad marginal border to fore wings ; and a broad one to hind wings, more or less completely enclosing a series of spots of the color of the yellow ground of wing. In *Philodice*, that sort of border to hind wing is the exception, and there is great variation in its border, and in the length of it, as well as the breadth ; while in *Eurytheme* form of the species that sort of border is the usual. As to color, most of the females are lemon-chrome, many very deep, others lighter, running into lemon-yellow. The darker examples could not be matched in any series of *Philodice*.

I have but five examples of the last fall brood of the butterfly, which came from pupae 1–3 Oct. The two females that laid the eggs which produced these stand by them, and are lemon-chrome in color, with broad borders to hind wings. All the five butterflies are small as compared with those of the early broods ; the males have narrower borders, and very large orange spots. The three females have a narrow border to hind wing, extending from upper branch of sub-costal to second branch of median ; the color is lemon-yellow, but the hind wings are very green, and much dusted with fine gray scales, more so by far than any of the June brood. In fact, there is the same sort of difference between these October examples and those of June and July as there is between the orange forms *Ariadne* and *Eurytheme ;* that is, the form *Hagenii*, so far as I can judge by the examples under view, is itself seasonally dimorphic.

On the under side, the June and July butterflies, males, are all chrome-yellow over both wings, and of a very uniform shade throughout the series ; all have sub-marginal points or patches on both wings, a patch at outer angle of hind wing. The uniformity is remarkakle on this surface as compared with *Philodice*. Whereas the October butterflies are pale colored, whitish-yellow, the hind wings densely dusted gray ; the females still paler, still more heavily dusted ; and all have great discal spots. So that the dimorphism is borne out by the under as well as the upper side. Further observations are desirable on this fall brood, and I hope this season to be able to make them.

Colias *Eurytheme*, as well as *Philodice*, *Alexandra*, *Meadii*, *Harfordii*, hibernates in larval stage, but if the larvae are kept in a warm room, they often will go on to pupation, reaching chrysalis even in mid-winter. I suppose my larvæ of September would naturally have hibernated in Colorado, and in such case the butterflies from them would have come from chrysalis in early spring. That would make the dimorphism

of this yellow form run parallel with that of the orange, of which *Ariadne* is the winter and *Eurytheme* the summer form. (In *Philodice* there is no seasonal dimorphism discernible.)*

Polymorphic forms of butterflies are especially interesting biologically, for they may be regarded as species in the making. It is conceivable, for example, that each one of these forms of *Eurytheme*, under certain conditions, might become separated from the other, and breed true to its own type. In other words, come to be a species, and I doubt not, very many species of butterflies have come to be in this way.

I have said that none of my bred males have had orange in the wings. But I have two males, one taken by Mr. Morrison, in south Colorado, the other by Mr. Nash, at Pueblo, which have a pretty strong shade of the chrome color on fore wings that characterises so many of the females.

Hagenii is known to fly throughout the Rocky Mountain region from Colorado to British America. I had many examples from Mt. Judith, Montana; others from Bismarck, Dacotah, and along the boundary line of B. America, in same Territory. Mr. Morrison also brought examples from Montana, but I know not what part. So several have been sent me from San Bernardino, by Mr. Wright and Mr. Hulst, and I think it probable the yellow form accompanies the orange over much of the territory occupied by the latter. On the plains to the east of the mountains, these would have been regarded as *Philodice* by collectors.

The yellow male figured in But. N. A., vol. 1, on plate of Colias *Keewaydin*, fig. 7, is *Hagenii*, a very small example. Mr. Henry Edwards is quoted in the text as writing that "the male of the new species *(Keewaydin)* is constantly subject to run into the lemon-yellow variety."

As to the larvæ, they vary greatly; some having no trace of a sub-dorsal band; others have a slight yellow line in place of band; others have decided yellow lines or narrow white bands. Not one of my bred larvæ has had a sub dorsal band with red in or running through it. On the other hand, Mr. Nash has sent me several nearly mature larvæ which produced *Hagenii* butterflies, in which either the white sub-dorsal band with red line through it was present, or a white band without red. In one letter Mr. Nash writes: "Out of 24 nearly full grown larvæ of this Colias that I have, 14 have the sub-dorsal line, but none a distinct white

* Mr. Nash informs me that form *Ariadne* often flies at the end of the season, at Pueblo, the temperature having permitted the larvæ to mature.

line (band) with red running through it, as had the one that changed to the chrysalis which I last sent you."

I happen to be feeding now two mature larvæ of *Eurytheme* from eggs sent from Colorado by Mr. D. Bruce, and these vary as does *Hagenii*. One has a mere trace of sub-dorsal band—a line ; the other a continuous yellow band one-third the width of the white basal band, and with no red or black about it.*

As will have been seen, I have been under great obligation to Mr. Nash for the interest he has taken in these experiments, and the aid he has rendered in these four years. If I have succeeded in raising ten broods from eggs to imago, I have failed in as many more, from one cause or other, principally, however, the destruction of either eggs or young larvæ in the mail, owing generally to the summer heat in transit, but the trouble to Mr. Nash was all the same. In spite of miscarriages he persevered in obtaining and forwarding eggs, and felt as anxious as I did to establish the true position of this form *Hagenii*.

I lost some of the first of the broods by disease which attacked either larvæ or chrysalids, sometimes destroying every example of one or other. This led me to give up breeding in glasses for this species, and try the larvae on clover growing in pots. I kept half a dozen pots ready, with a sod of white clover in each, and when young larvae were received placed them on the leaves, and covered the whole with a muslin bag. When the leaves were much eaten, the larvae were transferred to a second pot, and so on to maturity. In this way I have avoided disease completely, and it was little trouble to take care of the larvae, beyond getting the pots ready. White clover is preferable to red, I find for such purpose, as being low growing with smaller leaves. Many species of Colias also decidedly prefer white to red clover. The same mode of treatment has been successful with other species of Colias. It is necessary to watch for small spiders, which may be on the plant, but I do not often lose larvae from this cause. Of course I intend in due time to give one, and perhaps two plates to *Hagenii*, after I have learned all I can about its dimorphism.

* These larvæ have since writing the above produced *Eurytheme*, the one with yellow s. d. band an orange male.

ON SO-CALLED REPRESENTATIVE SPECIES.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

The species of our insects having near allies in the better known or earlier known European fauna, have been called "representative" by the elder Agassiz. And this term would be sufficiently exact and useful did we not associate with it the somewhat metaphysical sense, that these forms were separately created and owe their resemblance to the arbitrary will of the Creator. But the fact is that they are allied in blood, and we have found that they were once indistinguishable members of a common fauna. But now the American forms can be picked out with more or less certainty, in their several stages, by experts, and, where this can be done, the question comes up as to the designation to be employed. Shall we call them *varieties*, geographical if you will, or *species?* For my part, having studied so many of these forms, I would give them separate specific titles. For the reason that "we may regard theoretically all species as only relatively stable; practically we have to find out the cycle of reproduction and be guided by these results in our nomenclature."* And, further, because in one and the same fauna, species are so recognized and so named, differing as slightly from each other as do these so-called "representative" species inhabiting different continents. I would call, then, our Copper butterfly *Chrysophanus Americanus* and not *phlcas* var. *Americanus*. Only where the insect intergrades, interbreeds, is the term variety, I think, admissable. As a matter of fact, our American "representative" species do neither. I cannot too often insist that we, as entomologists, are here to discriminate, to talk about and illustrate the differences we find in insects, not to lump and to obliterate. From observed distinctions are born those wider conclusions to which all science tends. We need facts bearing upon each other. Here is a difference between the English and the German mind. The latter is too apt to be satisfied with the mere accumulation of learning, the compilation of literary data, catalogues, the *machinery* of science. Forgotten papers, interesting but barren incidents, a penurious dwelling on an undigested mass of detail, these often suffice for the learned German. But the English mind uses all this as a workman does his tools. Darwin came, and the before useless stores of facts were used to open our minds to the state of things about us.

* *Grote.*—The Hawk Moths of North America, p. 13.

The particular point here, however, is that these "representative" species vary *unequally*. There are all sorts of resemblances, stronger or weaker. Among the *identical* species I have referred to *Scoliopteryx libatrix*, and this is a remarkable species from its isolated structure. It is a Xanthid form, so peculiar that it has no quite near ally, and it is the same in Hudson's Bay Territory as in Europe. I have reared it from the thistle near Buffalo. Species which have such strong characters in tuftings and cut of wing are surely the same, and I have thus no doubt that our tufted cabbage *Plusia* is the same as the European, whether it was imported or whether, like *Scoliopteryx*, it is an unchanged survival. Only a certain judgment is necessary, arising from the handling of much material, to decide these points. It is a question of the *kind* of difference, not the apparent quantity. Smaller or less obvious characters are sometimes valid ones, while larger and prominent features are invalid. I should never describe as a species a form of the yellow species of *Rumia*, because black and yellow spotted insects, and especially *Geometridæ*, are prone to vary very much. Experience is especially needed in species-making. It is a little odd to notice, in this matter of varieties, how anxious some writers are to draw in the species of others, even when they absolutely do not know them, and how indifferent they are about drawing in their own varieties. They remind me of those people in ancient times who were so attentive to the wanderings of Ulysses and so oblivious of their own. My own mistakes have been sufficient to make me cautious. I do not forget that I described *Catocala sinuata* as a species distinct from *C. coccinata* Grote. But it seems to be better, when one is not quite sure, to claim the species at first, rather than describe as a variety what may turn out, in the long run, to be an independent form, having its cycle of reproduction perfectly distinct, and nowhere in the round of its life falling in with the circle of its neighbor.

ON THE GENERA ALLIED TO HOMOPTERA.

BY A. R. GROTE, A. M.

I have (CAN. ENT., vol. xv.) shown the different structure of the tibiæ in the genera of N. Am. *Noctuidæ* allied to *Homoptera* Boisd. But sometime previously I pointed out that this name was used for a section of Hemiptera, and that for this and other reasons we should probably be thrown back upon *Pheocyma* of Hübner.

This genus seems to differ by the middle and hind tibiæ being spinose. While *Ypsia* is so indifferently founded by Guenèe that he gives no character at all except a presumed larval one, I find that *Umbrina* Grote, and *Undularis* Drury, differ by the tibiæ being unarmed. In the related genus *Matigramma* the middle tibiæ alone seem spinose, at least in my *rubrosuffusa* they are so. But this is not the *type*, which must be studied for this character. Again, I have many years ago proposed to distinguish *Zale* by the generic character of the body tufts. Finally, the otherwise amply distinct genus *Homopyralis* has the slender tibiæ unarmed. It is evident, therefore, that good and valid characters separate the genera allied to *Homoptera*, or rather *Pheocyma*, and that my *Ph. unilineata* and the rest may be arranged by the tibial armature, although superficially so much resembling *Ypsia*. Guenèe takes no note of this, and seems quite at a loss in this group of the Owlet Moths. I had myself very little material in my collection of these genera, and I neglected their exact study accordingly.

It is with much pleasure that we have just learnt of the appointment of the Rev. George W. Taylor, of Victoria, Vancouver Island, B. C., as Honorary Provincial Entomologist of British Columbia. Mr. Taylor has been an active member of our Society for some years, and has done much good work, not only in Entomology, but in general Natural History, by working up the little known but exceedingly interesting fauna of Vancouver Island. He is one of the best Conchologists in the Dominion, and has the finest collection of British Columbian shells extant. His knowledge of Ornithology and Botany will materially enhance the value of his work as Provincial Entomologist, and his appointment cannot but result in great benefit to the farming community of the Province. We tender our sincere congratulations, not only to Mr. Taylor, but also to the Minister of Agriculture and the Provincial Legislature, for the wisdom that has been displayed in the choice of an incumbent for this important office. There are many "first-class pests" which require attention in our Pacific province already, and doubtless, now the Canadian Pacific Railroad is completed, many others from the east may be expected to be introduced by that means, and it is only by having the services of a trained scientific student at their disposal, to identify the marauders, and give information concerning the habits and best means of remedying their attacks, that the farmers can hope to protect themselves against the injuries yearly inflicted by insects.

ON THECLA FALACER AND INORATA.

BY A. R. GROTE, A. M.

The object of this note is to draw attention to a paper printed at Demopolis, Ala., Dec., 1870, in which I endeavored to reply to Mr. Scudder's objections to our determination of Hübner's Plate of *calanus*. I say: "The chances are against Hübner's having figured both sexes of the usually unspotted *T. inorata* with the spotted secondaries of *calanus* nob. Leconte has certainly figured *T. inorata*, and, as we stated before, Boisduval has used the specimen of Godart's *T. falacer* (*T. Edwardsii* Auct.) while furnishing the text. Boisduval considered Leconte's Plate as representing a form of *T. falacer*, and erroneously so, as Leconte figured for the first and only time *T. inorata*." Prof. Saunders afterwards describes the larva of *inorata* in CAN. ENT. I conclude that the two species are correctly separated and named by us in Trans. Am. Ent. Soc. I., 172, and give the synonymy. I wish to draw attention to this paper of mine, to state that, in any case, Mr. Scudder's version of Hübner's Plate is *uncertain*, from the similarity of the two species. Also, that we, having been the first in print to separate, name, and describe the two, our determination, being certain, should henceforth obtain and have priority as regards these two species of *Thecla*. The paper above referred to is now out of print, but is in several libraries and was generally distributed.

[NOTE.—Mr. Scudder writes in reply to our enquiry, that "there is not the slightest doubt as to what species Hübner figured under the name of *calanus;* it is certainly the *inorata* of Grote & Robinson." . . . "for the proper synonymy of these species, see Buffalo Bulletin, 1876, p. 110."—EDITOR *per* J. F.]

BOOK NOTICES.

The following publications have been received:—"Belostomidæ and some other Fish Destroying Bugs," by George Dimmock; "Maple Sugar and the Sugar Bush," by Prof. A. J. Cook; "Entomologica Americana," vol. iv., Nos. 1, 2 and 3; "The Conchologists' Exchange"; Journal of the Columbus, Ohio, Horticultural Society; Bulletin of the Iowa Agricultural College, Botanical Department; Proceedings of the Natural Science Association of Staten Island; "The Owl," Glen Falls, N. Y.; "Science Gossip," Chatto & Windus, London, England; "The Prairie Farmer"; "The American Agriculturist;" "The Ottawa Naturalist;" etc.

CORRESPONDENCE.

CARABUS AURATUS.

Dear Sir: Mr. Grote's reference, in your June issue, to Dr. Harris's observation on *Carabus auratus*, deserves some attention. The "Insects Injurious to Vegetation" was one of my early helps to an introduction to Entomology, and in reading the passage referred to, I was led, in my inexperience, to speculate upon the probability of meeting with the beautiful beetle mentioned.

Many years ago Mr. P. S. Sprague showed me the specimen itself in Dr. Harris's collection, now in the care of the Boston Natural History Society, and told me that he had been led to surmise that this was Dr. Harris's first insect capture, and that it had been the means of turning his attention to the study and observation of insects, with the excellent result so familiar to us all. It is hardly necessary to say that the identification was correct, but the specimen was an entirely accidental introduction, and did not perpetuate its species.

It seems to me that it would be very desirable if those having a knowledge of the accidental occurrence of foreign insects in our country would publish the particulars.

F. Blanchard, Lowell, Mass.

PAPILIO CRESPHONTES.

Dear Sir: On May 8th, I observed four caterpillars of *Papilio Cresphontes* about two-thirds grown feeding on the Lombardy Poplar *(Populus dilatata)*. The *Cresphontes* has been increasing rapidly since its first appearance in this locality in 1878. Its caterpillar has hitherto seemed to be restricted to plants of the Rue family. Leaving the Orange of the Southern States, it came north to feed upon the Prickly Ash *(Xathoxylum Americanum)* and Hop-tree *(Ptelea trifoliata)*. Both these being scarce in this locality, it has taken to the Lombardy Poplar. It may be remarked that *Populus* is botanically widely separated from the *Rutaceæ*.

W. P. Shannon, Greensburg, Indiana.

June 27, 1887.

THE ANNUAL MEETING.

The Annual Meeting of the Entomological Society of Ontario will be held in London during the month of October. The exact date is not yet decided upon, but it will be announced in our next issue.

Mailed Sept. 17.

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The Canadian Entomologist.

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THE NORTH AMERICAN CALLIMORPHAS.

BY H. H. LYMAN, M. A., MONTREAL.

The North American species of the genus Callimorpha are exceedingly interesting both from their beauty and from the extreme variations to which some of the species are subject, and which has given rise not only to the creation of numerous synonyms, but also to distinct species being regarded as merely varieties of other forms.

A very slight study of the literature of this subject is sufficient to show that these forms have been very badly treated by the "authorities," whether "lumpers" or "splitters," who have in this instance been but blind leaders of the blind; and some of those who during the last two years have endeavored to clear up matters a little, have not succeeded in making confusion less confounded. This confusion is also largely owing to the inaccessibility of the figure of Boisduval's species, and to the description by subsequent writers of new forms without any illustrations, which is particularly objectionable in the case of a group subject to great variation.

My attention was first seriously directed to this genus about six or seven years ago, by a paper read before the Montreal Branch of the Entomological Society of Ontario, by Mr. F. B. Caulfield, who advanced the opinion that several distinct species were confused under the all-embracing name of *Lecontei*.

At that time the only white and black form which I had seen was the true *Lecontei*, of which I had an excellent series showing most extraordinary variations, and I was disposed to listen very incredulously to Mr. Caulfield's theories; but an examination of his specimens convinced me that he had some grounds for his views, and I therefore turned my attention to the group, and have studied it as I have had time and opportunity since.

Besides my own and the other Montreal collections, which now contain a very good series of these moths, I have had the opportunity of examining the collections of the Museum of Comparative Zoology at Cambridge, Mass., the collection of the Boston Society of Natural History, the Harris collection, the collections of Messrs. Henry Edwards, B. Neumoegen and Herman Strecker, and last year the British Museum collection. I am also indebted to Mr. A. G. Butler, of the British Museum, for colored drawings of Walker's type specimens which he sent me in 1882, and to Mr. B. P. Mann and Mr. Scudder, for a copy of the original description of Boisduval's *Lecontei*. I have therefore not approached this difficult subject lightly, and it is only because I feel confident that I can clear up some of the errors which have so long prevailed that I now venture to publish the results of my studies. In any attempt to unravel the tangle into which these forms have been thrown by the leaders of entomological science, the first thing to be done is to find out what *Callimorpha Lecontei* of Boisduval really is, instead of jumping to the conclusion that any white and black specimen, or even a pure white one for that matter, is that form. The description of *Lecontei* given in Guerin's "Iconographie du Regne Animal de G. Cuvier," may be translated as below:

Species with White Secondaries.

CALLIMORPHA LECONTEI, Boisd. Guerin, Iconographie, etc., p. 518, plate 88, fig. 4.

(Figures 1 and 2.)

"Body white, with the top of the head of a pale yellow and a black or brown line extending from the prothorax to the extremity of the abdomen.

"Primaries black or brown, according to the more or less fresh condition of the insect, each having five large rounded and irregular white spots, touching each other sometimes as in the specimen figured, in which the two spots in the middle are united, while in another it is the two spots at the apex which are confluent.

"Secondaries immaculate.

"The under side resembles the upper, but having the black parts very pale. Legs lightly tinted with yellow.

"Expands 52 milli. Hab.—North America.

This description, taken in connection with the figure of which I previously had a drawing, but which I had the pleasure of seeing for myself

last year through the kindness of Mr. W. F. Kirby, enables me to definitely determine the true *Lecontei*, of which I have a full series, and typical forms of which are shown in figures 1 and 2 of the accompanying plate.

This species varies in almost every conceivable manner by the spots becoming confluent in different ways, and it even mimics the forms with yellow hind wings in occasionally having the white suffused with a tinge of ochre yellow. But there is one way in which it never varies, and that is that there is always a prominent process on the brown border of the inner margin of primaries, nearly one-third from the inner angle from which a band usually extends towards the apex. In expanse my specimens vary from 44–52 m.m., the average being about 48 m.m.

C. Leucomelas H. Sch. is only a synonym of *Lecontei*, being the form represented in fig. 2, in which the two spots towards the apex are united. Fig. 3 is only a further variety of *Lecontei* showing the gradual transition to fig. 4, which is a true specimen of the typical *Militaris* of Harris, as figured and described in his Insects Injurious to Vegetation. Fig. 5 represents a very interesting specimen which, though undoubtedly a variety of *Lecontei*, mimics *Interrupto-marginata* (what a pity it is that we cannot use Harris's manuscript name *Anchora!)* very closely in markings.

The form which Walker and many other entomologists have mistaken for *Lecontei* is that figured Nos. 7–9, of which I shall have more to say later on.

The other forms described by Walker were *Confinis*, *Contigua* and *Conscita*.

CALLIMORPHA LECONTEI, var. CONFINIS, Walk.

Hypercompa Confinis, Walk., Cat. Lep. B. M., III., p. 651.

(Figure 6.)

"Alba; caput, prothorax, abdomen, basi et coxæ anticæ ex parte lutea; thorax et abdomen fusco vittata; alæ anticæ marginibus plerumque fasciaque obliqua fuscis.

"White. Head, prothorax, fore coxæ and abdomen at base luteous. Proboscis tawny. Palpi with black tips. Antennæ black. Thorax and abdomen with a brown stripe. Fore wings brown with a discal slightly angular white stripe, and an elongate triangular oblique sub-apical white band. Length of the body 6 lines; of the wings 18 lines. *a—d*, United States, from Mr. Dyson's collection."

This form varies somewhat, but a fairly typical specimen is shown in fig. 6. It may possibly be a distinct species, but I believe it to be merely a variety of *Leconteï* of the *Militaris* type, in which the tooth-like projections extending backwards from the costa have disappeared.

CALLIMORPHA CONTIGUA, Walk.

Hypercompa Contigua, Walk., Cat. Lep. B. M., III., page 651.
Callimorpha Reversa, Stretch (in part), Ent. Amer., I., p. 104.
(Figure 10.)

"Alba; caput et prothorax lutea; palpi nigri, basi lutei; antennæ nigræ; thorax et abdomen fusco univittata; alæ anticæ marginibus plerumque fascia postmedia vittaque subapicali fuscis; posticæ macula submarginali fusca.

"White. Head, prothorax and fore coxæ luteous. Proboscis tawny. Palpi black, luteous at the base. Antennæ black. Thorax and abdomen with a brown stripe. Fore wings brown, with a white discal stripe, which widens from the base to a little beyond the middle, and with two large sub-apical white spots. Hind wings with a small brown spot near the hind border. Length of the body 6 lines; of the wings 18 lines.

"*a*. United States."

This description, if possessing the merit of briefness, has certainly very little else to commend it, and so Mr. Saunders in his synopsis described the markings of the wings as follows:

"Primaries white with blackish-brown stripes; one along the costa to near the tip; one on the inner margin, joined at its extremity with an oblique transverse band, extending to the costa; from the centre of this latter a stripe extends to the hind margin, somewhat enlarged at its termination, where it is centred with white. Hind margin partially edged with brownish-black.

"Secondaries white, immaculate."

In order to make sure that the form so clearly described by Mr. Saunders was the one that Walker intended by his description, I sent a drawing of this form and of some others to Mr. Butler, who returned them to me with sundry notes upon them, and confirming this determination as correct. These drawings I sent to Mr. Stretch in 1885, upon the appearance of his description of *Reversa*, and asked him if his species was not the *Contigua* of Walker as illustrated by my drawing. To this letter I have never received any answer, nor have I been able to get my drawings

back, although I have written to him repeatedly to ask him to return them. My last letter, under date of Nov. 15th, 1886, I registered in order to make sure that it would reach him, and subsequently learned from the P. O. authorities that it had been duly delivered to the addressee. *Contigua* is a particularly well marked and constant form, and I think there can be no doubt that it is a good species. It varies slightly as all species will, but I have never seen an example which tended in any way to connect it with any other form.

I now come to the form which Doubleday and Walker mistook for *Lecontei*, and which has been almost universally confused with that species, but it differs so greatly from the true *Lecontei* that I feel convinced that it is a distinct species.

CALLIMORPHA CONFUSA, n. sp.

Hypercompa Lecontei, Walk. (not Boisd.), Cat. Lep. B. M., III., p. 651.

(Figures 7—9.)

Head and collar orange-yellow, the latter with two dark brown spots. Palpi orange-yellow tipped with black or dark brown. Antennae black. Thorax white, yellowish towards the abdomen, with a wide central brown stripe. Abdomen white, yellowish at base and tip, and with a dorsal dark brown stripe. Beneath, legs ochre-yellow; anterior coxae with a black spot; fore and median femora, tibiae and tarsi, dark brown exteriorly.

Primaries dark brown, with from five to six rather large irregularly shaped white spots, and two or three small ones. Of the large spots the one at the base is oblong, the second is generally bifid, but occasionally entirely divided, forming two distinct spots. The third is usually nearly round, the apical spot oval or oblong, occasionally united with the third; the fifth spot near the outer margin is large, subtriangular and sometimes broken into several spots.

Secondaries white, immaculate; but occasionally with a partial brown border running from a little below the apex to the middle of the outer margin, and with one or two brown dots near the anal angle. Beneath, primaries have the brown markings much more strongly reproduced than in *Lecontei*, and far more suffused with yellow than in that species.

Expands 37–42 m. m. = $1\frac{7}{16}$–$1\frac{5}{8}$ inch.

Larva found feeding on *Cynoglossum officinale*, L. (Common Hound's Tongue), one or two on a plant, June 12th, 1881.

Length 1⅛ inch, nearly cylindrical. Head small, black and shining, with a few short blackish hairs. Body above black, with a yellow mottled with orange dorsal stripe, and two similar but very much broken ones along each side. Between the dorsal and subdorsal stripes there is a very broken line of a bluish white colour. Each segment has from ten to twelve small black warts from each of which radiate a few black and grey bristles. Beneath bluish slate grey.

On June 19th, it was observed that these larvæ had changed their appearance as follows: The dorsal stripe is deep yellow and is composed of two oblong spots placed longitudinally on the middle of each segment, and several lighter yellow ones placed transversely on the folds between the segments. The upper lateral stripe is narrower and more broken, being composed of marks of irregular shapes and sizes. The lower stripe is broken up into a few scattered streaks, and the broken line of bluish white spots has disappeared.

Beneath, pale drab with a tinge of yellow and a few minute black dots. Prolegs same colour as the under surface, but with a shining black patch on the outside of each. Feet dark brown with light markings.

Entered pupa stage June 19th, 20th; emerged July 12th to 14th; duration of pupa stage, 23 to 24 days.

One female laid a large batch of eggs July 14th; examined under the microscope were found to be smooth, round, flattened at base, honey yellow; diameter .028 of an inch.

Eggs hatched July 25th; duration of egg stage 11 days.

Young larvae, length .10 of an inch. Head brown, shining, with a few hairs; body transparent yellow, warts placed as in mature larva, brown, shining, with a few light coloured hairs; feet brown. I left home early in August and took these larvae with me, but was obliged to change their food to Dandelion. On August 13th the following description was taken:

Length ⅛ of an inch. Head black; mouth parts light coloured. Body dull white, marked with dark brown and bright yellow. The dorsal region is white, and there is a double, broken and irregular subdorsal stripe of dark brown. On each side there is a broken but distinct bright yellow band, and below the spiracles there is an irregular brown band, lighter than the sub dorsal one. Warts small, black, shiny, with a few short hairs, principally black, but a few light coloured. Beneath dirty white; feet brown; prolegs dirty white, with a brown patch on outside.

When these larvæ are shaken off a leaf they let themselves down by a silk thread. Subsequently I lost all these larvæ by death. This species varies almost as much as *Lecontei*, but not so as to approach any other form as far at least as I have seen, and I have examined over thirty specimens. It is much smaller than *Lecontei*, and the underside is strikingly different.

It never varies in the direction of *Militaris*, and in some specimens the white spots are very much reduced in size, as shown in fig. 9. As Mr. Caulfield has pointed out,* *Lecontei* varies in the direction of albinism *Confusa* in the direction of melanism.

In the Cambridge Museum there are four specimens of this species, with a blank label attached by Prof. Agassiz. Three of these are from Trenton, N. Y., which is the locality that the British Museum specimens came from, and one is from Kanawha, West Virginia.

CALLIMORPHA SUFFUSA, J. B. Smith.

Callimorpha Reversa, Stretch (in part), Ent. Amer. I., p. 104.

Callimorpha Suffusa, J. B. Smith, Ent. Amer. III., p. 25.

(Figure 11.)

This form has been so clearly described by Mr. Smith that it is not necessary for me to add anything in the way of description to what he has already published. I had myself intended to describe it as new, giving it the name of one of the sisters of Clymene, on account of its remarkably close resemblance, in everything but colour, to the species named after that nymph, and I cannot help thinking that the name chosen by Mr. Smith is by no means appropriate.

This form is very distinct and varies very little, if I may judge from a large series in the Cambridge Museum which were taken by Mr. Boll at Dallas, Texas. Its distinctness from *Contigua* is evident, from the fact that the markings are not only wholly dissimilar, but the transverse brown line from inner angle reaches the costa about two-fifths from the base, whereas in the latter the point of contact is about two-fifths from the apex.

Notwithstanding the total dissimilarity of these forms, Mr. Stretch has evidently regarded them as one species, but there is one point in which his diagnosis is unintelligible to me; he says, "in *Lecontei* the main transverse band starts from inner angle and goes to the apex,

* 16th Report of Ent. Soc. Ont., page 38.

while in *Reversa* it starts from *outer margin* and goes to the anal angle." The italics are mine, and I would suggest that he probably means the costa or anterior margin.

Mr. Smith is also in error in charging Mr. Caulfield with mistaking this form for *Lecontei*, as the three forms to which that gentleman referred* were *Lecontei*, *Contigua* and *Confusa*.

Mr. Smith is also quite astray in saying that *Lecontei* is distinct from *Militaris*, and I therefore judge that he has himself mistaken *Confusa* for *Lecontei*.

Callimorpha Fulvicosta, Clemens.

Hypercompa Fulvicosta, Clem., Proc. Acad. Nat. Sc. Phil., p. 536.
Callimorpha Vestalis, Pack., Proc. Ent. Soc. Phil. III., p. 108.

(Figure 12.)

Head and collar deep yellow, palpi yellow tipped with dark brown, antennæ dark brown. Thorax white, tipped with yellow behind. Beneath, legs yellow, fore and median tibiæ and tarsi brown exteriorly. Abdomen creamy white, yellowish at base and tip.

Primaries white; costa, especially below, edged with ochre yellow or occasionally brownish.

Secondaries white, immaculate.

Expands, 48–50 m.m. = 1⅞–2 in.

This form is, I believe, a distinct species, as I have never seen any specimens which varied from the type further than in the presence or absence of a slight brown edging to costa of primaries.

It occurs abundantly along with *Suffusa* at Dallas, Texas, where a large number were taken by Mr. Boll. The one figured on the plate was one of these, and I am indebted to Dr. Hagen for it.

Species with Yellow Secondaries.

These species are fewer and more easily separated than those in the former section, and if it had not been that one of the forms has been overlooked by most entomologists, it would not be necessary for me to treat of them at all.

Callimorpha Clymene, Esper.

Hypercompa Clymene, Esper Schm. IV., 22, 10 pl. 182; Noct. 103, Fig. 1.

Callimorpha Carolina, Harris. Report, p. 243 (1841).

Head and collar orange yellow, the latter with two deep brown or

* 16th Rept. Ent. Soc., Ont., page 38.

black dots; palpi orange yellow tipped with black, antennæ black. Thorax white, yellowish behind, with a broad central brown band. Beneath, thorax yellow, legs yellow, fore coxæ with a black or brown dot, fore and median femora and tibiæ dark brown exteriorly, fore and median tarsi brown. Abdomen ochre-yellow with a dorsal row of brown dots which are sometimes almost obsolete. Primaries marked exactly as in *Suffusa*, (fig. 11). Secondaries ochre-yellow, immaculate, or with a brown dot near anal angle. Beneath, all the wings are deep ochre-yellow, the brown markings of primaries being reproduced more or less distinctly except towards apex and outer margin. Expands, 53–58 mm. = 2 1/16–2 1/4 inch.

This species is well known and distinct. It varies somewhat in the maculation of primaries, but not so far as ever to render its determination doubtful.

CALLIMORPHA INTERRUPTO-MARGINATA, De Beauv.

Bombix Interrupto-marginata, De Beauv., Ins. Afriq. et Amer., p. 265, pl. 24, figs. 5, 6.

Callimorpha Anchora, Harris, MS.

Hypercompa Comma, Walk. Cat. Lep. B. M. III., p. 652.

Head whitish, front and vertex ochre-yellow, palpi yellow tipped with black. Collar and thorax white with a broad median brown band. Beneath, legs as in *Clymene* except that the spot on fore coxæ is wanting. Abdomen ochre-yellow with a dorsal brown stripe.

Primaries creamy white, suffused with yellow at the apex, with a dark brown stripe along the costa to near the apex, a band of the same colour along the inner margin to inner angle, near which it branches, sending forward half way to the costa a broad, slightly curved band, which marks, when the wings are closed, have a slight resemblance to an anchor.

Outer margin with an incomplete brown border, widest at the middle.

Secondaries ochre-yellow with a brown spot near anal angle.

Beneath ochre-yellow with the brown markings partially reproduced.

Expands, 47–49 mm.

Hab., Canada to Florida.

This very distinct species seems to be the most constant of any and it is a shame that it should be burdened with such an abominable name. The markings are very close to fig. 5, except that there is no spur on the costal border, and that there is the brown spot on secondaries.

CALLIMORPHA CONSCITA, Walk.

Tanada Conscita, Walk. Cat. Lep. B. M. XXXII., p. 377.

Callimorpha Lactata, J. B. Smith, Ent. Amer. III., p. 25.

"Mas. Alba; caput luteum; palpi oblique ascendentes, verticem non superantes, articulo 3^tio^ longi-conico; antennæ nigræ, setosæ; thorax antice luteus; abdomen flavum; pedes flavi, fusco varii; alæ anticæ costa lutea; posticæ flavæ. Var. B. Abdomen flavo-album; alæ posticæ flavo-albæ, anticæ costa flavo-alba. Fœm.—Antennæ sub setulosæ; abdomen album; alæ albæ; anticæ costa lutea.

"Male. White; head and fore part of the thorax luteous. Proboscis tawny. Palpi luteous, pubescent, obliquely ascending, not rising so high as the vertex; third joint elongate-conical, not more than half the length of the second. Antennæ black, setose. Abdomen yellow, not extending beyond the hind wings; apical tuft very small. Legs yellow, smooth; spurs moderately long; anterior tibiæ and tarsi brown above. Wings elongate, fore wings slightly rounded at the tips; costa luteous. Hind wings yellow. Var. B.—Abdomen, except the apical tuft, yellowish white. Hind wings, yellowish white. Fore wings, with a yellowish white costa. Female.—Antennæ very minutely setulose. Abdomen and wings white, except the costa of the fore wings. Length of the body, 7 to 8 lines; of the wings, 20 lines."

It would seem that the female above mentioned must have been a specimen of *Fulvicosta*, but the male is a good species, although its describer treated it so badly as to put it into a wrong genus. Mr. Butler sent me, in 1882, a coloured drawing of Walker's type, and I immediately recognized that it bears the same relation to the species with yellow secondaries as *Fulvicosta* does to those with white ones.

I think that the fact that Walker mistook *Fulvicosta* for the female of this species should not destroy the validity of his name, and I have therefore cited Mr. J. B. Smith's name *Lactata* as a synonym.

The results of my studies would lead me to group these species as follows:

CALLIMORPHA, Latreille.

1. Clymene, Esper.
   Carolina, Harris.
2. Interrupto-marginata, De Beauv.
   Anchora, Harris, MS.
   Comma, Walk.

3. Conscita, Walk.
   Lactata, J. B. Smith.
4. Lecontei, Boisd.
   Militaris, Harris.
   Leucomelas, H. Sch.
   ——— var. Confinis, Walk.
5. Contigua, Walk.
   Reversa, Stretch (in part.)
6. Confusa, Lyman.
   Lecontei, Walk. (not Boisd.)
7. Suffusa, J. B. Smith.
   Reversa, Stretch (in part.)
8. Fulvicosta, Clemens.
   ♀ *Conscita*, Walk.
   Vestalis, Packard.

I am very anxious to obtain larger series of specimens, showing the extremes of variation of all the forms, from all over the continent, and will be glad to purchase or obtain them in exchange for other specimens. Collectors will also confer a favour if they will report to me which species occur in their localities.

EXPLANATION OF PLATE.

No. 1. Callimorpha Lecontei, Boisd.....Montreal
" 2. " " " ..... "
" 3. " " " ..... "
" 4. " " " var. Militaris, Harr. "
" 5. " " " var..... "
" 6. " " " var. Confinis, Walk., Minnesota
" 7. " Confusa, Lyman..... .....Montreal
" 8. " " ..... "
" 9. " " ..... "
" 10. " Contigua, Walk .... "
" 11. " Suffusa, J. B. Smith.....Kansas
" 12. " Fulvicosta, Clemens..... .....Texas.

STUDIES OF THE NORTH AMERICAN PROCTOTRUPIDÆ, WITH DESCRIPTIONS OF NEW SPECIES FROM FLORIDA.

(Paper No. 3.)

BY WM. H. ASHMEAD, JACKSONVILLE, FLORIDA.

Sub-family MYMARINÆ.

LXVII. *Camptotera* Foerster.

LXVIII. *Ooctonus* Haliday.

107 (1). *Ooctonus longipes*, n. sp.

Female. Length .03 inch. Head and thorax black. Antennæ 11-jointed, scape and pedicel dilated below, flagellum and club pale brown, funicle joints slender, cylindrical, club greatly and enormously enlarged, not jointed. Legs long, slender, yellow. Abdomen ovate, black, shining; petiole slender, yellowish. Wings hyaline, very narrow, with extremely long ciliæ; submarginal vein short; marginal vein punctiform.

Hab.—Florida. Described from one specimen.

LXIX. *Limacis* Foerster.

108 (1). *Limacis aspidioticola* Ashm.

Aphelinus aspidioticola Ashm. Orange Insects, 1880, p. 9, pl. ii., f. 1, 4, 7, 9, 13.

Hab.—Florida.

LXX. *Gonatocerus* Nees.

109 (1). *Gonatocerus dolichocerus*, n. sp.

Female. Length, .07 inch. Head, thorax and the sessile abdomen above, black, the latter beneath, brownish-yellow. Antennæ 11-jointed, as long as the whole body, black; the club is greatly lengthened, thick and not jointed. Legs including coxæ, pale yellowish-brown, the fore tibiæ obfuscated along upper edges, posterior tibiæ and tips of femora, dusky. Wings hyaline, fore wings broadened and rounded at tips, surrounded with short ciliæ; sub-marginal vein, the only one apparent, black; hind wings linear.

Hab.—Florida. Described from one specimen.

110 (2). *Gonatocerus nigritarsis*, n. sp.

Female. Length .05 inch. At once distinguished from the other species by its smaller size, shorter antennæ, brown, not black, and the less

thickened antennal club; the legs are yellowish, the fore tibiæ not obfuscated along upper edges, although the posterior pair are; all tarsi dusky; abdomen entirely black.

Hab.—Florida. Described from one specimen.

This species somewhat resembles a European species in my collection, *. e., Gonatocerus ater* Foerster, but the paler colored legs easily separate it.

LXXI. *Litus* Haliday.

111 (1). *Litus armatus*, n. sp.

Female. Length .02 inch. Bright yellow. Eyes and flagellum brown. Antennæ 9-jointed, much longer than the whole body; scape and pedicel large, dilated below, first funicle joint short, not longer than wide, second as long as the thick club or terminal joint, other joints gradually shorter. Abdomen sessile with a dusky shade above at base; ovipositor exserted, stout, black, about two thirds as long as abdomen. Wings hyaline, narrow, with long ciliæ.

Hab.—Florida.

LXXII. *Alaptus* Walker.

112 (1). *Alaptus pallipes*, n. sp.

Female. Length .02 inch. Black. Head very large, much broader than the rather slender thorax. Antennæ 8-jointed, brown; scape short, dilated, pedicel small, first funicle joint shorter than second, second longer, third short but thicker than second, fourth much longer and thicker than third, fifth still longer but not so thick, club greatly swollen, as long as the scape. Abdomen sessile, ovate, not as long as thorax. Legs pale. Wings hyaline, with very long ciliæ, the fore wings spatulate, the hind wings linear.

Hab.—Florida.

LXXIII. *Signiphora* Ashmead.

113 (1). *Signiphora flavopaliata* Ashm. Orange Insects, 1880, p. 30, pl. ii.

Hab.—Florida.

LXXIV. *Eustochus* Haliday.

114 (1). *Eustochus xanthothorax*, n. sp.

Female. Length .03 inch. Head, prothorax and abdomen black; mesothorax and legs bright yellow; antennæ pale brown; tarsi four jointed; antennæ apparently (?) 9-jointed; tip of abdomen surrounding

anus, yellow. Wings extremely narrow, with long ciliæ; marginal vein elongated.

Hab.—Florida.

LXXV. *Doriclytus* Foerster.
LXXVI. *Mymar* Haliday.
LXXVII. *Pteratomus* Packard.

115 (1). *Pteratomus Putnamii* Packard. Guide to the Study of Insects, p. 202, pl. iii., f. 8, 8°.

Hab.—Massachusetts.

This genus is probably identical with *Mymar* Haliday.

LXXVIII. *Cosmocoma* Foerster.

116 (1). *Cosmocoma elegans* Howard. U. S. Agric. Rep., 1880, p 370. Hab.—District of Columbia.

There is a *Cosmocoma elegans* Foerster, in Europe, and this species may be changed to *C. Howardii.*

117 (2). *Cosmocoma maculipes*, n. sp.

Male. Length .03 inch. Black. Antennæ 13-jointed, longer than the whole body; scape and pedicel pale brown, flagellum black. Leg and petiole pale yellowish; femora and posterior tibiæ with a dusky blotch above. Wings hyaline.

Hab.—Florida.

This species is allied to *C. elegans* How., but the blotches on thighs and tibiæ will readily distinguish it.

LXXIX. *Ceraphractus* Walker.
LXXX. *Stictothrix* Foerster.
LXXXI. *Anaphes* Haliday.

118 (1). *Anaphes gracilis* Howard. U. S. Agric. Rep., 1880, p. 370 Hab.—California.

119 (2). *Anaphes mellicornis*, n. sp.

Female. Length .03 inch. Shining black. Antennæ 9-jointed, honey-yellow, the club dusky. Legs honey-yellow, femora and posterior tibiæ somewhat testaceous. Wings hyaline.

Hab.—Florida.

Sub-family DIAPRIINÆ.
LXXXII. *Coptera* Say.
(? *Entomacis* Foerst.)

120 (1). *Coptera polita* Say. LeConte's Ed. Say's Works, ii., p. 728. Prov., Le Nat. Can., xvi., p. 181.

Hab.—Indiana, Canada.

LXXXIII. *Platymischus* Westwood.

121 (1). *Platymischus torquatus* Prov. Le Nat. Can., vol. xvi., p. 182. Hab. Canada.

122 (2). *Platymischus abdominalis* Say (Psilus). LeConte's Ed. Say's Works, ii., p. 729. Hab.—Indiana.

LXXXIV. *Galesus* Curtis.

123 (1). *Galesus ciliatus* Say (Psilus). LeConte's Ed. Say's Works, i., p. 383. Hab.—Indiana.

124 (2). *Galesus obtusus* Say (Psilus), l. c. i., p. 383.

Hab.—Indiana.

125 (3). *Galesus colon* Say (Psilus), l. c. ii., p. 727.

Hab.—Indiana.

126 (4). *Galesus quebecensis* Prov. Petite Faune Ent. du Canada, ii., p. 559. Hab.—Canada.

127 (5). *Galesus floridensis*, n. sp.

Male. Length 06 inch. Black, polished, with some sparse scattered pile, except on collar, where it is dense and white. Face prolonged; antennæ 14-jointed, piceous, much longer than body, joints with long white hairs; scape considerably swollen in the middle. Legs: coxæ, tips of femora, tibiæ and tarsi honey-yellow, femora black. Wings subhyaline. Hab.—Florida.

LXXXV. *Aneurhynchus* Westwood.

128 (1). *Aneurhynchus apicalis* Say, l. c. ii., p. 727.

Hab.—Indiana.

129 (2). *Aneurhynchus spinosus* Prov., l. c. ii., p. 56.

Hab.—Canada.

130 (3). *Aneurhynchus inermis* Prov. Add. Faune Hym., p. 176.

Hab.—Canada.

131 (4). *Aneurhynchus aneurus* Prov., l. c., p. 176.

Hab.—Canada.

LXXXVI. *Labolips* Haliday.

LXXXVII. *Cephalonomia* Westwood.

132 (1). *Cephalonomia hirticollis*, n. sp.

Male. Length .08 inch. Black, highly polished. Antennæ 12-

jointed, dark red, scape paler at base, funicle joints very small, the four terminal joints greatly enlarged or swollen moniliform, the last joint is a little longer than broad. Prothorax densely covered with white pile. Legs dark red. Wings hyaline, veins yellowish.

Hab.—Florida.

133 (2). *Cephalonomia floridana*, n. sp.

Male. Length .05 inch. Entirely black, polished, excepting knees and tarsi, which are piceous. Antennæ 12-jointed, three terminal joints large moniliform, last joint being about as large as the two preceding ones together. Collar hairy; wings hyaline.

Hab.—Florida.

LXXXVIII. *Paramesius* Westwood.

134 (1). *Paramesius terminatus* Say (Psilus). LeConte's Ed. Say's Works, ii., p. 727. Hab.—Indiana.

LXXXIX. *Idiotypa* Foerster.

XC. *Hemilexis* Foerster.

135 (1). *Hemilexis mellipetiola*, n. sp.

Male. Length .05 inch. Slender, black. Antennæ 13-jointed, moniliform, gradually incrassated, red-brown; scape, legs and petiole of abdomen, honey-yellow, femora slightly obfuscated. Thorax without grooves. Metathorax covered with white pile. Wings hyaline, ciliate; no marginal vein. Hab.—Florida.

XCI. *Spilomicrus* Westwood.

136 (1). *Spilomicrus longicornis* Prov. Petite Faune Ent. du C., ii., p. 56. Hab.—Canada.

137 (2). *Spilomicrus foveatus* Prov. Add. à la Faune Hym., p. 176. Hab.—Canada.

XCII. *Diapria* Latreille.

138 (1). *Diapria brevicornis* Say (Psilus), l. c. i., p. 221.

Hab.—St. Peter's River.

139 (2). *Diapria erythrothorax*, n. sp.

Male. Length .05 inch. Stature of *Diapria tritoma* Thoms. Head and abdomen black; thorax red; antennæ and legs honey-yellow; wings hyaline. Hab.—Florida.

XCIII. *Loxotropa* Foerster.

140 (1). *Loxotropa mellea*, n. sp.

Male. Length .09 inch. Honey-yellow with long sparse, scattered

pubescence. Eyes and tip of abdomen brown. Antennæ 14-jointed, first funicle joint longer than pedicel or the second funicle joint, other joints moniliform, of nearly the same thickness. Mesothorax without grooves. Petiole of abdomen very thick dilated below. Wings hyaline, but with a yellowish cast, very pubescent.

Hab.—Florida.

XCIV. *Basalys* Westwood.

141 (1). *Basalys ruficornis* Prov. Petite Faune Ent. du Canada, ii., p. 560. Hab. Canada.

XCV. *Glyptonota* Foerster.

XCVI. *Monelata* Foerster.

143 (1). *Monelata mellicoilis*, n. sp.

Female. Length .05 inch. Slender; head, thorax and abdomen polished black. Antennæ 13-jointed, honey-yellow; scape long, pedicel longer than first funicle joint, flagellar joints small, moniliform, terminal joint enormously enlarged or swollen, brown. Collar and legs honey-yellow. Mesopleuræ piceous. Mesoscutum without grooves. Wings hyaline, with long ciliæ.

XCVII. *Polypeza* Foerster.

Sub family BELYTINÆ.

XCVIII. *Ismarus* Haliday.

XCIX. *Psilomma* Foerster.

144 (1). *Psilomma americana*, n. sp.

Male. Length .12 inch. Slender, black. Antennæ and legs honey-yellow. Antennæ 13-jointed, filiform, very long, reaching beyond tips of wings when folded, apical half dusky; the pedicel is annular, third joint excised outwardly half its length. Thorax sparsely pubescent, with two distinct grooves. Wings hyaline, veins brown; there is a basal cell and a small, closed triangular marginal cell; the radial vein projecting backwards to the middle of the wing.

Hab.—Florida.

C. *Oxylabis* Foerster.

CI. *Belyta* Jurine.

CII. *Synacra* Foerster.

CIII. *Pantolyta* Foerster.

CIV. *Zygota* Foerster.

CV. *Aclista* Foerster.
CVI. *Acropiesta* Foerster.
CVII. *Anectata* Foerster.

144 (1). *Anectata hirtifrons*, n. sp.

Female. Length .12 inch. Black, slightly pubescent. Face and cheeks covered with dense white pubescence. Antennæ 14-jointed, and when bent backwards reach to tip of abdomen; scape long, slightly bent or curved, pedicel annular, first five funicle joints longer than wide, following joints moniliform. Antennæ and legs rufous. Mesothorax with two grooves. Scutellum convex with a deep transverse groove at base. Abdominal petiole long, cylindrical, same thickness throughout. Wings hyaline, veins brown; the closed marginal cell is longer than the marginal vein.

Hab.—Canada. Described from one specimen kindly given me by Mr. W. H. Harrington, of Ottawa.

CVIII. *Pantoclis* Foerster.
CIX. *Macrorhynosis* Foerster.
CX. *Xenotoma* Foerster.

145 (1). *Xenotoma mellipes* Say (Cinctus). LeConte's Ed. Say's Works, p. 726.

Hab.—Indiana.

CXI. *Leptorhaptus* Foerster.
CXII. *Cinctus* Jurine.

146 (1). *Cinctus nasutus* Prov. Add. a la Faune Hym., p. 178.

Hab.—Canada.

CXIII. *Diphora* Foerster.
CXIV. *Zelotypa* Foerster.
CXV. *Miota* Foerster.

A NEW VARIETY OF PAPILIO AND A NEW CATOCALA FROM THE PACIFIC COAST.

BY JAMES BEHRENS.

I have received from Mr. Behrens, of San Francisco, the following descriptions for publication, and with them the specimens to which they refer. The *Papilio* is a very extraordinary aberration, probably owing

its color to a change in the food plant. I learn from Mr. Behrens that four specimens were obtained, all agreeing with each other. The Catocala is, I have no doubt, the form referred to by me (Pacific Coast Lepid., No. 14, Proc. Cal. Acad Sc., 1875) as having been seen by the late Baron Terloo at San Jose, Cal. I think it a good species, and in this view I am sustained by those excellent authorities on Catocala, the Rev. G. D. Hulst and Prof. G. H. French.

Hy. Edwards. (New. York.)

Papilio Rutulus, var. Ammoni, Behrens.—A very peculiar form, in which the ground color of all the wings is of a deep but rather dull orange color, and the bands and marks of the upper side all rather broader and more distinct than in the normal form. The orange color prevails also on the lower side, though a little mottled with lighter shades. Four specimens, male and female. Nevada. Taken by my friend, Herr v. Ammon, of San Francisco, in whose honor it is named.

Catocala Elda, n. sp., Behrens.—Allied to *C. Relicta*, Walk., and more closely to its variety, *C. Phrynia*, Hy. Edw. It differs from this, however, by the superior wings being of one shade of grizzled gray, the whole surface covered with mottled scales obscuring all the lines except the t. p., which is straighter than in *C. Relicta*, and less deeply toothed. The orbicular is very large and distinct. The inferior wings are very much like those of *C. Relicta*, only the medium band is much narrower than in the Eastern species. On the under side the black band and discal spot are very distinct, black, and not shading into brown, as is usually the case with the common species. It is also smaller, the expanse of wings being only 68 mm., while that of *C. Relicta* averages 78 mm. Three examples. Portland, Oregon. Taken at the light of electric lamp.

CORRESPONDENCE.

Editor Can. Ent.: Allow me to correct two mistakes in my paper on the *Bombycidæ*, p. 156 *et seq.* of this volume. For "oval" p. 157, line 3, read "oral." For "North American," p. 159, line 17, read "American," as it is, indeed, evident from the context, that I wished to credit the *Ceratocampinæ* to both North and South America. It is, I believe,

absent from the West Indies, and the peculiar distribution of this subfamily has long engaged my attention. A. R. GROTE.

Bremen, Aug. 15, 1887.

Dear Sir: In reply to Mr. Henshaw's note as to *Carabus auratus*, I quote here Dr. Harris's words: "I have taken one specimen of this fine *Carabus* in Massachusetts and we have several *other* species which are equally predaceous," etc. (p. 72). There is not a word about the probable introduction of the specimen, and no reader could suppose that Dr. Harris thought it introduced. As it stands it is most certainly a "curious" identification, and seeing that Dr. Harris was by no means infallible (as seen in his describing *P. celeus* as *P. carolina* L.) it might be readily doubted. The italics *(other)* are mine, and certainly this word covers the origin of *C. auratus* in North America. In my paper I did not venture, nor intend, to do more than call attention to this remark of Dr. Harris's. If they shall have borne the fruit promised by Mr. Henshaw, my words will have been justified. But when *C. auratus* comes to be mentioned, it will be proper to state that Dr. Harris's reference to this species (House Report, April 1838, p. 72) is such a one that the reader must believe Dr. Harris regarded the European *C. auratus* as a Massachusetts species also.

The House, before whom Dr. Harris laid his Report, could come to no other conclusion from its language than that *Carabus auratus* was found in Massachusetts as well as in France. As to what Dr. Harris had then, or at a later date, affixed to the specimen in his collection, the House could have no knowledge and as little care. Dr. Harris's style is quite clear. It is not necessary to know German to understand his English. Therefore, on the whole, I was warranted in calling his identition as it stands, "curious." A. R. GROTE.

THE ANNUAL MEETING of the Society will be held on 26th and 27th October, at OTTAWA *(not London, as stated in our last number)*. Members are requested to bring with them, or send, papers to be read at the meetings. MSS. and specimens for exhibition or distribution may be sent to the care of Mr. Fletcher, Central Experimental Farm, Ottawa.

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COMPARATIVE TABLES FOR THE FAMILIES OF BUTTERFLIES.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

The need of a better knowledge of the actual structure of butterflies among those in this country who follow their study, is shown by the persistence with which an antiquated classification is adhered to,—a classification whose only value is historical, which conceals affinities and takes no account of the progress of investigation. In the hope of stimulating the examination of objects and not of books, the following Table for the determination of the four families of butterflies, originally prepared for my forthcoming work on the New England species, is here published. As will be seen, it includes in the analysis every stage of life, and while it intentionally oversteps the boundaries of New England in some respects, it does not, for the earlier stages, pretend to cover the outer field, excepting where it seemed important for some special purpose. Many of the characters here tabulated have never before been pointed out; others are the common property of science; that all characters are exhausted, or that some, and especially those drawn from the earlier stages, may not with increase of information require modification, is by no means maintained.

A. *Imago* of variable size, usually rather slender, with ample wings. Head in a vertical plane, the tongue being inserted opposite the lower half of the eye. Antennae approximate at the base, the space between them not equalling half the vertical diameter of the eye, the tip of the club rarely curved and never produced to a distinct point. Eyes with no overhanging pencil of bristly hairs, though in rare cases (some Lycaeninæ) a small tuft of hairs occurs at the base of the antennæ; cornea of eyes not extending over the posterior fourth of the ocellar globe. Front tibiæ rarely (Papilioninæ) with any epiphysis, and hind tibiæ with only terminal spurs. Inner edge of hind wings rarely (Papilioninæ) plaited, but

extending beneath and partially embracing the abdomen; fore and hind wings in repose resting in the same plane. *Egg* either distinctly higher than broad and then vertically ribbed; or sub-globular and then smooth or reticulate; or broader than high and then usually echinoid or tiarate. *Larva at birth.*—Head usually broader and higher than the body; the latter either with ranged appendages (of various shapes) generally longer, often much longer, than the segments; or with fleshy tubercles, especially on the thoracic segments. First thoracic segment with no distinct corneous dorsal shield. *Mature larva* variable in form, but generally cylindrical, often spinous, never with a strongly contracted and distinct neck, and without distinct thoracic shield. Generally constructing no place of concealment. *Chrysalis* generally (excl. Lycaenidæ) more or less angulate or with projecting shoulders, very rarely (in our species never) enclosed in a cocoon.

1. *Imago.*—Clypeus not only occupying the face, but extending also over half the crown of the head, and separated from the epicranium by a distinct (in Danais, slight) transverse furrow between the antennæ. Base of the antennæ wholly separate from the inner edges of the eye. Prothoracic lobes tolerably large and above tumid. Wings with the outer margins usually crenulate, dentate, sinuate, or angulate; front pair with two inferior subcostal nervules, originating at the extremity of the cell; inner margin of hind wing always embracing the abdomen. Tetrapod, the fore legs being unused and atrophied, especially in the ♂, but in both sexes the terminal appendages of the last tarsal joint absent (excepting in Libythea, where the claws are present in the ♀), and both spines and spurs of tibiae obsolete. *Egg* either reticulate and then sub-globular, or else vertically ribbed over at least the upper half of the egg, and then never more than one half as high again as broad. *Larva at birth.*—Head generally larger, never smaller, than the thoracic segments and generally scabrous; when of the same size, the corneous crown of the head is never encroached upon by the integument of the first thoracic segment, and the body is covered either with series of very long hairs (in which case most of them are acicular and not clubbed at the tip) or with extremely short and distant acicular hairs. *Mature larva* generally cylindrical, the head usually held in a vertical position, larger than the segments behind it, free and posteriorly contracted. Body

furnished with continuous rows of spines or smooth lenticular warts, or with discontinuous rows of fleshy tubercles, or with short pile; in the last case either the head is tuberculate or the last abdominal segment is furcate, or both. *Chrysalis* generally angulate, often strongly angulate, or if rounded, with shouldered prominences. It always hangs in a reversed position by its tail alone, except in the rare case of a few Satyrinæ, which are rounded, without special prominences, have no cremastral hooks, and undergo their changes in a crevice or a cell in the ground. Fam. I.—*Nymphalidæ.*

2. *Imago.*—Clypeus occupying but little more than the face and separated from the epicranium by a slight suture between the antennæ. Bases of antennae inserted in distinct sockets, which either clearly infringe on the inner edge of the eye, or are open next that edge. Prothoracic lobes minute, generally appressed to a mere lamina. Wings with the outer margin generally entire, especially in the fore wing, but the hind wing often tailed; fore wings with only one inferior subcostal nervule arising at the extremity of the cell; inner margin of hind wings generally but not always embracing the abdomen. Hexapod, the front legs being employed in walking, and not atrophied excepting in some males (Lycaenidæ, esp. Erycininæ), where they are partially atrophied, and sometimes have the tarsi reduced to a single unarmed joint. *Egg* either smooth, or else reticulate (and then tiarate or hemispherical), or else vertically ribbed (and then greatly elongated, nearly or quite twice as high as broad). *Larva at birth.*—Head always smaller or no larger than the thoracic segments and usually smooth; when of the same size, either the corneous portion of the crown is partially covered by the integument of the first thoracic segment, or the body is furnished with very long or very short hairs, almost all of which are clubbed at the tip. *Mature larva* cylindrical, or anteriorly enlarged, or onisciform. Head usually held in an oblique position, generally small, contractile and not free. Body never furnished with spines, but either naked, or furnished with discontinuous rows of tubercles (in which case the head is always smaller than the succeeding segments), or with short pile (when the head is uniform and the last abdominal segment entire), or with fascicles of longer hairs. *Chrysalis* angulate or rounded, often

with no prominences whatever. It hangs in various positions, but is always attached not only by its tail, but also by a silken girth around the middle, and in rare cases is also enclosed in a feeble silken cocoon. Some few tropical Erycininæ are said to lack the transverse girth.

a. *Imago* of small size and delicate structure. Front of head between the eyes much narrower than high. Eyes not projecting beyond the general contour of the head, notched on the inner margin, to give room for the antennal sockets. Antennae including the club straight. Metathorax only slightly separated from the mesothorax. Median cell of fore wings closed by a weak vein; median nervure of hind wings with three branches; the inner margin never plaited. Fore legs with no tibial epiphysis, sexually heteromorphous, the tarsi of the ♂ being more or less atrophied. Dorsal margin of the eighth abdominal segment of ♂ entire. Upper organ of ♂ genitalia with long, slender, strongly curved lateral appendages. *Egg* tiarate or hemispherical, and more or less deeply reticulate. *Larva at birth*, so far as known, furnished with numerous long, tapering hairs arranged in longitudinal series. *Mature larva*, so far as known, either onisciform or cylindrical; in the latter case the body is furnished with longitudinal series of fasciated hairs. *Chrysalis* usually short and stout, always bluntly rounded in front, the body rarely furnished with projections, and these invariably rounded. Median girth always close to the body at all points, the ventral surface of the body lying in a nearly uniform plane. Cremaster not at all or but slightly protuberant, the hooks inferior or apical. Fam. II. *Lycaenidæ* (Erycininæ + Lycaeninæ).

b. *Imago* of medium or large size. Front of head between the eyes as broad as high. Eyes prominent, not infringed upon by the antennal sockets. Antennae straight, or, especially the club, sinuate. Metathorax markedly separate from the mesothorax. Median cell of fore wings closed by a strong vein; median nervure of hind wing with three or four branches, the inner margin sometimes plaited. Fore legs of both sexes as complete as the other pairs, sometimes with an epiphysis on

the inner side of the tibiæ. Dorsal margin of the eighth abdominal segment of ♂ notched or produced to a hook. Upper organ of ♂ genitalia with no lateral processes. *Egg* subglobular and smooth, or very much elevated and longitudinally ribbed; (one known exception occurs in Parnassius, in which it is tiarate, but where, in contradistinction to the Lycaenidae, it appears to be overlaid with raised polygonal plates). *Larva at birth*, so far as known, furnished with longitudinal series of clubbed or forked hairs or with prickly tubercles. *Mature larva* cylindrical or enlarged anteriorly, covered with very short pile (in some exotic forms with long hairs), mostly arranged in transverse rows, or with rather infrequent and irregularly distributed minute hairs, and often also with series of fleshy tubercles or filaments or glabrous scarcely elevated warts. *Chrysalis* elongate, unimucronate or bimucronate in front, generally with numerous angular projections. Median girth frequently free from the body for a considerable part of its course by the ventral extension of the wing sheaths, the ventral surface of the body being generally bent near the middle. Cremaster strongly protuberant and free, the hooks apical. Fam. III. *Papilionidæ* (Pierinæ + Papilioninæ).

B. *Imago* of small or medium size, usually robust, with rather small wings. Head in a horizontal plane, the tongue being inserted opposite the middle of the eye or even higher. Antennae widely separated at the base, the space between them more than equalling half the vertical diameter of the eye, the tip of the club more or less distinctly pointed and recurved. Eyes usually overhung at the outer base of the antennae by a curving pencil of bristly hairs, the cornea extending over almost the entire ocellar globe. Almost invariably the front tibiae have a foliate epiphysis on the inner side, and the hind tibiae a middle pair of spurs in addition to the terminal pair. Inner edge of hind wings plaited, the fore and hind wings in repose often resting in different planes. *Egg* never noticeably higher than broad, hemispherical and smooth or domed and vertically ribbed. *Larva at birth.*—Head always broader and higher than the body, the latter with ranged fungiform appendages, never, excepting on the seventh and eighth abdominal segments, so long as the segments. First thoracic segment with a distinct corneous dorsal shield. *Mature larva* cylindrical but slightly flattened beneath and stoutest in the middle,

never spinous, generally minutely and coarsely pilose, with a large head, slender neck, and a transverse corneous shield on the upper surface of the first thoracic segment. Always living in concealment. *Chrysalis* smooth and uniform, rarely with a mucronate head, always enclosed in some sort of a cocoon. Fam. IV. *Hesperidæ.*

THE NUPTIALS OF THALESSA.

BY W. HAGUE HARRINGTON, OTTAWA.

For several years I have observed with much interest the oviposition of our large and handsome "long-stings," but not until this summer have I been able to witness their actions preparatory to this duty. Although the males are frequently numerous when the females are ovipositing, the sexes pay no attention to one another, and this fact led me frequently to wonder at what time mating occurs. Last year I had, in company with Mr. Fletcher, observed the males in strange positions, with the tip of the abdomen applied to the bark, or inserted in a crevice, and had suggested that they were awaiting the emergence of the female. The supposition was, however, not proven, and the actions observed were still a matter of conjecture, and for further observation.

On the afternoon of the 7th June last, I visited some old maples *(Acer saccharinum)* for the special purpose of making observations on *Oryssus*. The trees are in different stages of disease and decay, and are correspondingly infested by such borers as *Dicerca divaricata*, *Tremex columba*, *Xiphydria albicornis*, *Oryssus Sayi*, etc., while they attract naturally numbers of our larger Pimplidæ, such as *Thalessa*, *Xorides*, *Ephialtes* and *Xylonomus*. Upon these trees during their season could generally be found many specimens of *Thalessa*, but I had never seen one emerge from its prison into the warmth and light of its adult existence. Upon a tree which for years had been much bored by *Tremex*, etc., I, upon the above date, saw several specimens of *T. atrata* and *T. lunator* ovipositing, and at some distance below them a group of males in an evident state of excitement. Three of these had their abdomens inserted more than half way under a flake of bark. Here, I congratulated myself, was an opportunity to ascertain whether a female was about to emerge. With my knife I pried off the piece of bark, and beheld the head of an

insect just appearing through the wood. The males had flown away when disturbed, and I was afraid that they might not return before the female emerged, but two came swiftly back and commenced to pay her attentions before much more than her head was visible. As soon as she was out of the burrow she was embraced by one, and copulation apparently followed, but did not last long, as she began to crawl up the trunk, and when I interfered to prevent her getting out of sight, the male flew away. However another was ready to take his place, and the pair were almost instantly *in coitu*. A few seconds later the female attempted to fly, and fell to the ground; the male disengaged himself and flew away, and his partner then did the same, starting with a strong and rapid flight.

Visiting another tree not many paces distant, I saw a group of more than a dozen males of *lunator* in very evident anxiety and excitement, their long antennae quivering, and their whole demeanor evidencing some powerful emotion. I peeled off a piece of bark at the centre of attraction, but found no sign of any insect coming forth. An hour or so later, when returning from my ramble, the group was even larger, and several were probing a crevice within an inch of the space from which I had stripped the bark. Thinking that the female might be here, I cut off another piece of bark, but could find no signs of her, although the males were so excited as even to settle on my hands.

Proceeding to the tree from which I had previously seen a female emerge, I found several males clustered about three inches from where she had come out. Two had the abdomen flexed and the tip inserted in a small aperture in the bark. Stripping off this fragment of bark, I found that a female was there, and had gnawed her passage so nearly through the bark as to have pierced the surface. The males fluttered excitedly around, and, as in the first instance, she was embraced before she had wholly emerged, and copulation was effected as soon as she was out. Being in a hurry, and wishing to preserve the specimens, I boxed them, the other males flying around me in great excitement until this was achieved.

Two days later I was able to visit the same locality for the purpose of making further observations on these insects. On tree number one I saw at some distance up the trunk a small cluster of expectant males. By standing on the top of a dilapidated and shaky fence, I was just able to reach the spot and with my knife remove the covering of bark As my position was too precarious for comfortable observation, I secured the

female as she emerged and carried her to another tree upon which were some males. As soon as she commenced to crawl up the trunk, she was eagerly followed and embraced by one of the more active males. Copulation took place with four different males—the female falling to the ground on each occasion, and being again seized as she crawled up—the last union continuing 2½ minutes, after which she flew away unattended.

On proceeding to tree number two, I found a very large and strongly excited cluster of the males in the immediate vicinity of the spot from which I had cut the bark on the former day. They were about twenty in number, and were packed so closely together that those in the centre could scarcely be seen. Like the inmates of a burning theatre, they trampled over one another in their excitement. Displacing them with some difficulty, I hewed off a slice of bark and revealed the female cutting her way to a new life, her head being partially visible. Her ardent admirers immediately swarmed around and endeavored to get their abdomens down the burrow, an undertaking in which they impeded one another so greatly that the only result was wedging the female in and preventing her from emerging. The cluster was soon so dense that she was entirely hidden, and as there seemed no prospect of her getting out for some time under the circumstances, I began to drive off, or rather to forcibly remove one by one, her besiegers. After nearly all were removed, I saw that one of the few remaining had his abdomen inserted its full length in the burrow. As the female was still unable to emerge, I drove off the remaining males, and as soon as the way was clear she came rapidly out. There was instantly fierce rivalry for her favors, but eventually one stronger, or more agile, than his fellows, succeeded in his desires, the pair remaining about 1½ minutes *in coitu*, after which the female ceased apparently to have further attractions.

The foregoing notes (written upon the second date of observation) show that the males are able to determine where a female is making her way outward—some time, perhaps, as in the last case recorded, many hours before she appears. Whether this is ascertained by the sense of hearing or smell, or a combination of both, I do not attempt to say, but the antennæ are evidently largely used in locating her, as may be readily seen by the way in which the bark is examined with them. When there is a crevice or aperture, the male bends his abdomen—at the suture between first and second segments—until it is at right angles to the thorax, and endeavors to insert it in the said crevice or aperture. He has

then the attitude of a female insect ovipositing. As has been mentioned, if the hole is large enough the abdomen will be fully inserted, and it is perhaps possible that copulation may take place while the female is yet in the burrow. On emergence she is instantly seized, the legs of the male clasping the yet unfolded wings with the abdomen, and thus preventing her from flying. From the large number of males always about at this season, it is probable that the female seldom, if ever, emerges unattended. After the very brief honeymoon, she is no longer an attraction to the opposite sex, and is able to proceed unmolested with her work of depositing the germs of a future generation. I may add that of the pair confined by me the male died the same or following day, while the female was strong and vigorous until she unadvisedly entered a cyanide bottle.

STRAY NOTES ON MYRMELEONIDÆ, Part 3.

BY DR. H. A. HAGEN, CAMBRIDGE, MASS.

(Continued from page 156.)

The following species are very interesting, as they possess no spurs at the end of the tibiæ. From N. America are four species, two not yet described. All agree in the following characters: They are very slender, more or less hairy or villous; head small, narrow; antennæ long, as long as head and thorax, or at least prothorax, stout, cylindrical, becoming gradually thicker but not clavate; labial palpi a little longer than the maxillary ones; last joint very little thickened to the middle, where a superior depression makes the apical half about cylindrical; legs short, not very thick, with numerous spines and bristles, but no spurs; first joint of tarsi longer than the following, but shorter than the apical one; abdomen of male considerably longer, of female shorter than the wings; appendages of male short approximate, cylindrical with strong hairs and spines, enlarged at the base to reach the dorsum of abdomen; between them below a very small triangular plate; female with two short flat appendages inferiorly; upper part rounded, split in the middle; wings elongate, narrow, enlarged to the bluntly pointed tip; post-costa oblique; venation dense, and sprinkled more or less with brown; costal space of front wings with two series of areoles (one species) or with one series, but the transversals in the apical half (or less) forked; at the extreme

base of the hind wings of the male is a small white free knob, homologous to the larger and darker knob of Palpares and Acanthaclisis. The larva of one species is known; it differs from all others and was described by me as perhaps belonging to *Acanthaclisis congener*.

Mr. McLachlan has described the female of a species from Turkestan as a new genus, *Maracanda amoena*, which has the same characters as the N. American species, with one series of areoles in the costal space of the front wings. The only exception is that the apical joint of the labial palpi are said to be very much dilated, what is not to be found in the N. American species. I do not know *M. amoena*, but I should think that its difference from *M. imbecillus* Stein., from Greece, should be proved. *M. conspurcatus* Kolenati, from the same locality with *M. amoena*, can not belong to *Creagris plumbeus*, where it is quoted by Brauer and McLachlan, as its size is by far too small and only very little larger than *amoena*. I can not compare the two Australian species, said to have no spurs.

I possess a couple of *M. imbecillus* Stein (Berl. Ent. Zeit., vii., p. 421) from Montenegro, Europe, which agrees entirely with *M. amoena*, and can not be identified with any other described species. The legs have no spurs,* contrary to Stein's description, but bristles, yellowish-brown, straight, half shorter than the basal joint. After this rather long preamble, I come to the question if perhaps some Myrmeleon, just as among Phryganids some Limnophilids have spurs which can be wanting or aborted, at least on the fore legs.

There are a number of N. American Myrmeleon, *M. longicaudus*, *M. ferus*, *M. nebulosus* and others, which nobody would separate from *M. conspersus*, except by the presence of spurs. Some have two series of areoles in the costal space, and some only one series, as in *Maracanda*. Nevertheless none of the seventeen *M. conspersa* before me has a spur, and none of the six *M. longicaudus* and the six *M. contaminatus* lacks spurs. Therefore I have the species without spurs described as belonging to *Maracanda*, and propose provisionally for the other a new genus, *Brachynemurus*.

Maracanda, McLachlan.

This new genus is described in A. Fedtschenko's Voyage in Turkestan, vol. ii., 5, Moscow, 1875. The largest part is in the Russian language. As the N. American species without spurs at the tips of the tibiae must

* Mr. H. J. Kolbe, Assistant of the Berlin Museum, has kindly compared Stein's type and confirms my statement.

be compared with this genus, and as only one Entomologist in the U. S. reads Russian, I give here a translation (by Prof. J. D. Whitney, in Cambridge, Mass.).

Maracanda, nov. gen.

Tibiae hand calcaratae. Antennae breves, robustae, clava elongata. Palpi breves, labiales articulo ultimo valde dilatato. Pedes breviusculi, tarsorum articulo primo multo longiori quam secundus, sed breviori quam ultimus. Abdomen alis brevius. Alae elongatae, angustatae, post-costa obliqua; alae posticae anticis paulo breviores; femina.

This genus, by the want of the spurs on the tibiae, is related to *Gymnocnemia*. The short, thick antennae, the construction of the palpi, however, make it impossible to put the species described below in the same genus with *G. variegata*, the typical species of the genus *Gymnocnemia*.

Remark.—*Myrmeleon occultus* Walk. and *M. malus* Walk., from Australia, also do not have spurs on the tibiae (in the description of these species, however, this peculiarity is not mentioned). It is very probable that both these species ought to be included in the genus *Maracanda*.

1. *Maracanda amoena*, McLachl., n. sp., p. 2, pl. i., fig. 1.

Pallide flava. Antennae brunneae, vix pallido-cinctae. Caput thoraxque lineis tribus longitudinalibus fusco-nigris supra signata. Abdomen nigrum vel fuscum, utrinque et infra flavo-lineatum. Pedes flavi, femoribus extra nigris, tibiis in medio et ad apicem nigris, articulisque tarsorum ad apices nigris. Alae albido-hyalinae, punctis plurimis (praecipae apicem versus) nigris conspersae, venis venulisque albidis, nigrostriatis, pterostigmate nigro-signato, femina.

Long. corp. circ. 15 m.m.; exp. alar. 34 to 40 m.m.

Habitat in deserto Kisil-kum; five specimens were collected May 12, 1871, in the region of sand-hills about 10 versts west of Djusebai Springs.

Antennae longer than the head and the front part of the thorax, gradually passing into a thick elongated clavate form, cinnamon colored with the exception of the basal joint; the cinnamon color of the remainder of the joints passes with a whitish color on the articulations; the body is bright yellow. The head has above three small elongated dusty lines, which unite with each other in front; on the side from the end of these dark spots there extends a single dusty transversal line; a single knotted line of the same color is seen on each of the antennæ; finally a single elongated dusky line extends along the front of the head. The labrum is

not long, but rounded on the front margin ; the labial palpi are somewhat longer than the maxillary, with the terminal joint much broadened, pointed, outside with a dark, large shining spot. The prothorax has parallel margins, and above three long, black or dusty lines, equally distant from each other. On the meso- and metathorax these lines are separated with distinct spots, among which appear a few small black lines and spots ; upon the side of the thorax two dark lines are seen on each side. Legs short and not very thick, bright yellow, covered with shining hairs ; on the outer side of each femur a dusty or reddish line ; each tibia is surrounded in the middle with a dark ring, frequently wanting in the posterior tibiæ. The abdomen is almost entirely black or dusty, with broad yellow rings on the sides and lower surface ; at the extremity of the abdomen are found two broad triangular plates, rounded off towards the end, approximate, surrounded internally with black bristles and covered externally with black hairs ; under these plates are placed two auxiliary palpi, one under each plate, the lower half of the following abdominal segment deeply cleft in the middle, and with a lengthened fringe joins a long cylindrical growth. The wings are long and narrow, the posteriors somewhat narrower and shorter than the anterior pair, whitish transparent, sprinkled with a great number of delicate black spots, particularly thickly grouped along the radius and the inner margin of the wings, and form an almost unbroken line along the outer series of gradate veinlets. The venation is very open (few transversal veins) ; the veins are pale whitish or whitish yellow, over the greatest part on the minute black spots ; the posterior wings have dark lines and spots in a small number; pterostigma whitish and black internally. (McLachlan.)

Of course I am unable to decide if the Russian translation of the English original is exact ; at least only in one place (genitals of female) I find some difficulty in understanding it.

2. *Maracanda conspersa*, Rbr.
M. conspersus, Rbr., 327, 3—Walk., 329, 47.

Body hairy, black, with whitish spots, very slender ; head small, face pale, above with a broad transversal blackish band, in which the antennæ are inserted ; this band is excised below in middle ; before the labrum on each side a brownish spot ; vertex cut straight in front, very little notched in middle, black, with a faint yellow lateral dot ; before the vertex a transversal pale band ; antennæ long, 7 m.m., strong, cylindrical, a little thicker

to the tip, which is bluntly pointed but not clavate; black, very faintly annulated with pale on a few basal segments; maxillary palpi short, brown, or blackish brown, base of cylindrical joints pale, last joint very little incurved, cut at tip, as long as 3rd and 4th together, 3rd a little longer than 4th, thicker on tip.

Labial palpi a little longer, basal joint pale; second longer, enlarged to tip, a little incurved; last joint longer, thicker to middle, above depressed, cylindrical, tip blunt; both joints blackish, pale on articulation.

Prothorax short, before the middle a transversal flat furrow, front margin slightly rounded; black with three yellow dots anteriorly and a posterior stripe on each side; with some white hairs, intermixed with black ones; mesothorax dull brownish gray, with a few scattered white hairs, two yellow dots anteriorly and four in a transversal series in the middle; the conical suture ending in the posterior margin pale yellow with a middle dagger-shaped black line, and on each side a shorter black line; in front of it two globular black shining elevations, which are approximate and like two ocelli; metathorax similar with some yellow spots.

Abdomen (male) longer than the wings, very slender, about cylindrical, blackish hirsute; brown, shining, darker below and at the apex; segments 2 to 4 with two pale dorsal longitudinal lines, which are sometimes partly confluent; the two following segments with two pale spots in middle; appendages brown, clothed densely with black hairs, straight, the base triangularly dilated to reach the dorsum of the segment; shorter than the last segment. Abdomen (female) much shorter than the wings, less slender, apical half thicker; color similar, but the long pale dorsal lines represented only by two middle and two apical spots; genital parts in the last segment with many strong black spines; upper part divided in two pale tubercles; below with two short brown appendages.

Legs short, pale, with white hairs, intermixed with a few black ones, principally at tip, densely sprinkled with black, the femurs sometimes nearly blackish; tip of tibia black; tarsi with apex of the two basal joints, the two following entirely, and tip of fifth, black; claws long, incurved, brown; spurs wanting.

Wings short, broadest before the bluntly-pointed apex; hyaline with white shades, a little fumose, the anteriors closely sprinkled with fuscous; venation dense, veins fuscous interrupted with white; around the transversals after the mediana and after the 4th vein, brown shades, sometimes forming brown streaks on the disk and near the hind margin; two series

of areoles in the costal space except near the base; hind wings less spotted.

Length of body, male, 32 to 44 m.m.; female, 21 to 27 m.m. Exp. al. 42 to 60 m.m.

Habitat.—I have before me 8 males and 9 females. From Canada; Upper Wisconsin River, Kennicott; from Hamilton, Ontario, Moffat; Michigan, a couple in alcohol, Capt. Meade; Ludington, Mich., Pierce; Port Huron, Mich., Hubbard; from New Jersey, Uhler; from S. Carolina, Zimmerman, the type of *M. Talpinus* Klug.; from Savannah, Ga., the type of *M. irroratus* Burm., vol. ii., p. 995, No. 11, with the label in Burmeister's hand-writing; from Millin, Scriven Co., Ga., July, by Morrison; from Florida, Norton.

The range of the species is very large; the largest specimens are from Canada and Michigan, the smallest from Georgia. The wings are more or less sprinkled.

The species has been raised from a larva which I had supposed to belong to *Acanthaclisis congener*, but Mr. Redtenbacher rightly doubted my determination. I have besides the described larva from Wyoming before me, one from Port Huron, Mich., and one from Crescent City, Fla., both collected by Mr. Hubbard. I can not find any difference between them and a larva from Ludington, Mich., by Mr. Pierce, who intends to describe the full history of the species raised by himself.

When I was still in Europe, I had determined "with some doubt" this species as the *M. abdominalis* Say. The large material now at hand has shown me years ago that Say's species is a different one. As there exist before Burmeister two different *M. irroratus*, Rambur's name has the priority; his type is a female. The *M. irroratum* Oliv., Encycl., viii., p. 126, No. 30 (copied by Walk., p. 408, No. 207), from Italy and Greek Archipel., is probably *M. imbecillus* Stein. The *M. irroratus* Klug., Symb., pl. 35, f. 6, from Arabia Felix, has visible spurs. The type is in the Berlin Mus.; I can not determine the species, but believe it is not a *Creagris*. After Mr. Taschenberg, there can be no doubt that the type of Burmeister of his *M. irroratus* in the Halle Museum, is different from his type in Winthem's Coll. The type in the Halle Museum is *M. longicaudus* Burmeister, after his type in Winthem's Coll. *M. contaminatus* Burm. is the female of *irroratus* type (in Winthem's Coll.); Mr. Taschenberg's description is conclusive. *M. nebulosum* Oliv., Enc. Meth., viii., 127, 35, from New York, is *M. conspersus* Rbr.; the description of

the color of abdomen excludes the other related species. *Myrm. contaminatus* was mentioned in a note to *M. irroratus* Burm., ii, 995, 11. The probable type was described in Giebel Zeits., vol. 52, 214, 30.

3. *Macaranda signata* Hag.

Body hairy, yellow, striped with brown; not very slender. Head small, face yellow, eyes margined with bright yellow, which is followed inside by a black line in the groove and another median one; antennæ brown with a bright yellow ring, followed on the face by a brown triangular spot; vertex elevated; its front margin notched in middle and on each side; above dark brown, sides and occiput largely yellow, also two transverse interrupted bands; a pale transversal band before the vertex, separated from the antennæ by a narrow brown one; maxillary and labial palpi as in *M. conspersus*, yellow, apical joint light brown; prothorax yellow, above with a broad brown band with a fine yellow median line and a yellow stripe on each side; sides whitish-villous; thorax yellowish with brown stripes, the pattern similar to *M. conspersa*. Abdomen of male about as long as the wings, less slender, whitish-villous, yellow, very finely sprinkled with blackish dots; sides and apex blackish-brown; a fine black median line on 3rd and 4th segments; appendages as in *M. conspersa*; abdomen of female much shorter than the wings, black, the apical half with some ill-defined yellow marks on the sides and tip of segments; legs in shape and color as in *M. conspersa*, but joints 3 and 4 black only on tip. The genitals are light brown, similar to *conspersa*.

Wings hyaline, not sprinkled; veins brown, interrupted with yellow; pterostigma yellow, faintly darker inside; venation as in *conspersa*, with the important exception that the costal space of front wings has only one series of areoles; the transversals in the apical half of the wing are forked.

Length of body, male, 27 m.m.; female, 21 m.m. Exp. al., 46 m.m.

Hab.—A female, fully developed, from White Fish Point, Lake Superior, by Mr. Hubbard, but the yellow color of the body is more slate color. Ludington, Mich., Mr. Pierce. The couple before me, in bad condition, were sent in 1881; later, when Mr. Pierce worked here, these specimens were mislaid and only turned up now. I am certain that this species was not among the specimens brought over with him. The male apparently has been transformed only a short time ago, therefore it can be presumed that its abdomen has not attained its full length.

4. *Maracanda Henshawi* Hag.

Body very slender, hairy, striped with yellow. Head very small; face yellow, black near antennæ; two small black dots on each side and one in middle; antennæ longer than head and prothorax, stout, cylindrical, tip narrowed; black, the basal joint and the articulations yellow; maxillary palpi pale with a brownish tinge, apical joint brownish; labial palpi white, apical joint after basal third dark brown; vertex elevated, black anteriorly, with a thin silvery felt; above yellow with two transversal black lines and some spots near occiput; prothorax black, a fine yellow median line and a yellow dot each side of the line near the front margin; sides largely yellow, with a blackish stripe; mesothorax black, anteriorly with two narrow lines, followed by a median one and two faint lines on each side, all yellow; metathorax black with a yellow cross of spots and lines; sides of thorax black, with two yellow lines; abdomen very slender, black, segments 2 to 6 with a dorsal yellow band, split by a faint black median line; appendages short, straight, cylindrical, brown, with a brush of black hairs; base going upward to dorsum; below between them a small black triangular plate, with yellow tip; legs short, thin, pale, femur externally black; tibiæ with white hairs, and some black bristles around tip; four anterior tibiæ sprinkled with black externally; tip of all, and tip of joints of tarsi black, more on last joint; no spurs; claws incurved, reddish-brown. Wings hyaline, narrow; costal space with one series of areoles and the transversals in the apical fourth of wing forked; veins brown interrupted with yellow; pterostigma small, yellow, with a blackish spot internally; wings very little sprinkled; along the anterior longitudinal veins the transversals shaded with brown; front wings with an oblique dark stripe parallel to the hind margin of the apex; hind wings less sprinkled along the anterior longitudinal veins.

Length of body 30 m.m.; exp. al., 40 m.m.

Habit.—Umatilla, Oregon; one male, June 24, 1882, collected by Mr. S. Henshaw.

This species is directly separated from the two foregoing by its small size, and by anterior face of the vertex being black.

5. *Maracanda? pygmaea* Hag.

Myrmeleon pygmaeus Hag., Syn. N. Am. Neur., p. 231, No. 13.

The type collected in Mexico by Mr. Deppe is in the Berlin Museum. Not knowing anything more about this smallest described species than

what is given in the Synopsis, I have not re-copied my description. The species arrived just in the last moment, when my manuscript was to be sent to Washington, therefore I have not given more details. The characters quoted—antennæ short, club large, almost orbicular ; wings short the apex very much dilated ; the venation peculiar, simple—make it doubtful if *M. ? pygmaea* belongs to this genus.

FURTHER INJURY TO LIVING PLANTS BY WHITE ANTS.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

More than twenty-five years since (Proc. Boston Soc. Nat. Hist., v. 7, p. 287-288) I published an account of serious injury to living grape-vines in hot-houses in Salem, Mass., by our common species of white ants. *Termes flavipes*. No further notice of their injury to living vegetation appears to have been taken until a few years ago, when Prof. J. H. Comstock, then government entomologist, stated (Rep. Comm. Agric., 1879, 207-8) that they had been found in Texas and Florida "girdling the bark of orange trees and guava bushes near the surface of the ground, or eating out the interior of sugar-cane and other plants." "When white ants infest living plants," the report goes on to state, "they attack that part which is at or just below the surface of the ground. In the case of pampas grass, the base of the stalk is hollowed ; with woody plants, as orange trees and guava bushes, the bark of the base of the trunk is eaten, and frequently the tree is completely girdled ; with sugar-cane the most serious injury is the destruction of the seed cane."

Still more recently, Dr. H. A. Hagen published in the CANADIAN ENTOMOLOGIST (v. 17, p. 134-136) another instance here in Cambridge where living maple trees were largely infested by them, though the ants appeared to have done little damage, the trees being "apparently in good condition," but one of them being felled it was found that for a couple of feet above the ground, to the depth of an inch from the surface, the trunk was extensively burrowed by the white ants.

In this same article, after referring to the injury reported from Salem, Dr. Hagen adds : "The earth in the hot-houses here in Cambridge is largely infested by white ants, but as far as I know, no destruction of

plants has been observed." This is no longer true, for in the autumn of 1886 I was asked to look at the green-house connected with Mt. Auburn Cemetery, to see if anything could be done to prevent the loss of geranium cuttings by an insect, which turned out to be the same culprit. The bed in which the cuttings were set was a long shallow wooden box or tray placed against the northern wall of the green-house; the tray was filled with moistened sand and kept constantly warm by being directly over a chamber heated by hot-water pipes. The ants thus found the precise condition which they prefer, warm moisture, and the wooden sides of the tray showed everywhere the characteristic gauges of the insect. The geranium cuttings were plunged near together in the sand, and the ants entering at the cut end had eaten out everything but the rind, and by the time they had penetrated the cutting above the level of the sand, the drooping leaves gave sign of the injury to the plant. Some, the leaves of which had begun to turn black, were found to have been eaten to the very bases of the terminal leaves, and a good deal of injury had been done, hundreds of cuttings having been destroyed; the trouble had been going on, I was told, for a year. As a light porous soil is required for the culture of the cuttings, and a receptacle allowing the passage of the water with a certain freedom, I recommended that the bottom of the tray be made of slate or tiles of the material from which flower pots are made, and the sides of zinc or other metal, high enough to come several inches above the sand.

ON COLIAS ERIPHYLE Edw., AND C. HAGENII Edw.

BY W. H. EDWARDS, COALBURGH, W. VA.

In my last paper I showed that *C. Hagenii* was a yellow form of *C. Eurytheme* Bois., and I am now prepared to say that *Hagenii* is identical with *Eriphyle*, and the name gives way to this. I described *Eriphyle*, Tr. Am. Ent. Soc., v., 202, 1876, from about thirty individuals of both sexes, taken in British Columbia, at Lake Lahache, by the late G. R. Crotch; and related that they were submitted to Mr. Henry Edwards, who pronounced them distinct from any of the Pacific coast species, an opinion with which I agreed. I said they came nearest *Philodice*, and pointed out the differences, which seemed to be decisive against their being of that

species; and concluded thus: "Mr. Mead brought from Colorado, in 1871, a Colias very close to this from Lake Lahache, and which in Reakirt's paper on the Butterflies of Colorado (Pr. Ent. Soc. Phil., 1867, p. 14) is doubtless the one called *Philodice*. The same form was brought from Montana, by Dr. E. Coues, when engaged in the Boundary Line Commission. For the present I shall give no opinion as to these, but they seem to me nearer *Eriphyle* than to *Philodice*." In this last expression I was right. The under sides of the *Eriphyle* were quite free from markings, sometimes completely so, except the discal spots, but some examples showed more or less of the sub-marginal spots and the other patches which are found in both *Philodice* and *Eurytheme* Now on comparing the 12 examples of *Eriphyle* still remaining in my collection with examples of *Hagenii*, there is no doubt of the identity of the two. I can match every *Eriphyle* by a *Hagenii* in either sex. The name *Hagenii* therefore is sunk, and this form will be known in future as Colias EURYTHEME, tetramorphic form ERIPHYLE (pronounced E-riph'-y-le).

The following letter, referring to above, is of importance as showing that twice Mr. Edwards came to the same conclusion independently concerning this species.—EDITOR, per J. F.

Coalburgh, W. Va., 24th Oct., 1887.

The Editor Canadian Entomologist:

MY DEAR SIR.—To-day, in clearing some loaded shelves, I came on a bundle of Dr. Coues' Reports "On the Collections of Insects made by Dr. Elliott Coues, U. S. A., in Dakotah and Montana, during 1873 and 1874"—Washington, 1878; of which I supplied the paper on Lepidoptera. And to my surprise, for I had quite forgotten particulars of the paper, not having looked at it for years, I find that I therein named the Colorado Colias, afterwards called *Hagenii*, as ERIPHYLE. The paper was written several years before it was printed, so that this description of *Eriphyle* really preceded the one printed 1876, Tr. A. E. Soc., and is headed Colias *Eriphyle* Edw., new species. After describing it I added these lines:

"I first received examples of this species from Mr. T. L. Mead, who took them in Colorado, in 1871, and was disposed to regard them as a variety of *Philodice*. Subsequently I received about 50 specimens, taken by the late G. R. Crotch, in British Columbia, and later, 1874, several specimens, which were taken by Mr. Pywell on the line of the Northern

Pacific Railroad west of Bismarck. This material enables me to judge with confidence of the distinctness of this species. It is not, in my opinion, a variety of *Philodice*, nor is it *Occidentalis*, Scudder, to which it bears some resemblance."

This paper is not referred to in my Catalogue of 1874.

NOTE ON SOUTHERN MOTHS FOUND IN THE NORTH.

BY A. R. GROTE, A. M.

Not unfrequently do I read of the capture of Southern *Noctuidæ* found in Canada and the Northern United States, with the added remark that the specimen was so fresh that it must have just escaped from chrysalis. These remarks are made while I am always (for ten or fifteen years past) saying that these are wind visitors, immigrants. So lately of *Erebus odora*. Now were this moth really found here as a larva, its large Catocaline caterpillar must have been found. It is improbable that the food plant of *odora* grows in the North. The scales are strongly adherent in all these *Noctuidæ fasciatæ;* the "fresh" moth has flown a thousand miles, more or less, according to my theory, which I seem to support alone, and of which then nobody can rob me. In fact I would rather be wrong, because then my ideas are not appropriated. Hübner has a weakness for considering the *Noctuidæ fasciatæ*, Geometers; so *Ptichodis bistrigata* (Can. Ent., 12, 87), *Eulepidotis alabastriaria* (not known to me), *Crochiphora flavistriaria* (Can. Ent., 12, 118) and others. Knowing *Brotis vulneraria* only from figures, I think it is a Noctuid and a wanderer from the South. *Erebus odora* may breed in Florida, in Texas, New Mexico, So. Colorado, but not with us. This is my theory of immigration from the South; no other writer agrees to it or advocates it. Right or wrong, it is my own. The great question with these species is the limit of successful hibernation, continuous residence, breeding. The Northern food plant must be produced by my opponents.

Change of Address.—Miss Eleanor A. Ormerod, from Dunster Lodge, Spring Grove, Isleworth, to Torrington House, Holywell Hill, St. Albans, England.

Mailed November 1st.

The Canadian Entomologist.

VOL. XIX. LONDON, DECEMBER, 1887. No. 12

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The Annual Meeting of the Society was held pursuant to notice at Ottawa, on Wednesday and Thursday, 26th and 27th October, 1887. The meeting was held in Ottawa at the request of several members, in order that an opportunity might be afforded to visit the Central Experimental Farm of the Dominion Government, to examine the valuable collections of insects in the Museum of the Geological and Natural History Survey of Canada, and to inspect the collections of the members resident in Ottawa. Through the kindness of the civic rulers, the meetings were held in the City Hall.

A Council meeting was held on Wednesday, at 10 a. m., on the adjournment of which the Museum was visited and the insect collections examined, the magnificent exhibit of Lepidoptera eliciting universal admiration.

In the afternoon the Experimental Farm was visited, the Director, Prof Saunders, kindly placing carriages at the disposal of the Council. A Council meeting was held in his office, after which he escorted the visitors around the farm, and explained the work already accomplished, and the plans for future operations. The house and barns in course of construction were justly admired, and it was evident to all that a great and useful work was being accomplished under the oversight of the Director and his skilful assistants.

In the evening a general meeting of the Society was held in the council chamber of the City Hall, and the Annual Address was delivered by the President, Mr. James Fletcher. Among the large audience present were, in addition to members of the Entomological Society, many officers and members of the Ottawa Field Naturalists' Club, of the Ottawa Literary and Scientific Society, of the Geological Museum, of various educational institutions, agricultural associations, etc., as well as gardeners and farmers from the surrounding country.

The address was a very instructive and practical one, and was listened to with great attention and interest by all present. It gave a sketch of the growth of the Society, and an outline of the work being done and to be carried on at the Government Experimental Farms. The value of Natural Sciences as a training for the mental faculties and the co-relationship of the different branches was shown. The latter portion consisted of a report on the insect injuries for the year and the broad general principles regulating the application of remedies. On its conclusion a vote of thanks to the President was moved by Rev. C. J. S. Bethune, who described the work being accomplished in England by Miss Ormerod, and illustrated it by an account of her exertions to ward off the attack of the Hessian Fly. The vote of thanks was seconded by Prof. Saunders, who confirmed the statements made in the address, and gave accounts of some experiments with solutions of Paris green as a preventive of Curculio in plums, and Codling Moth in apples. The President's address will appear *in extenso* in the Annual Report.

A collection of Coleoptera captured in the vicinity of Ottawa was exhibited by Mr. W. Hague Harrington. It was arranged in 18 cases and contained about 1,250 species.

The annual meeting of the Society for the election of officers, etc., was held at 11 a. m on Thursday, in a committee room of the City Hall.

The President, Mr. James Fletcher, occupied the chair, and the following members of the Council were among those present: Rev. C. J. S. Bethune, Port Hope; Mr. J. Alston Moffat, Hamilton; Mr. J. M. Denton, London; and Mr. W. H. Harrington, Ottawa.

The minutes of the previous meeting having been printed and circulated amongst the members. their reading was dispensed with, and they were duly confirmed.

Mr. W. H. Harrington was requested to act as Secretary in the absence of that officer.

Letters were received from Rev T. W. Fyles, Quebec; Mr. E. Baynes Reed, London; Mr. H. H. Lyman, Montreal; Mr. W. E. Saunders, London; Mr. J. D. Evans, Trenton; Capt. Gamble Geddes, Toronto, and others, announcing their regret at being unable to be present.

The Report of the Council was read by Rev. C. J. S. Bethune, and on motion of Mr. Denton, seconded by Mr. Moffat, it was duly adopted.

The statement of the Secretary-Treasurer (balance sheet) was received and adopted.

The Reports of the Montreal Branch, and of the Delegate to the Royal Society of Canada, were received and referred for publication.

The election of officers was then proceeded with, and the following gentlemen were duly and unanimously elected :

President—James Fletcher, Ottawa.

Vice-President—E. Baynes Reed, London.

Secretary-Treasurer—W. E. Saunders, London.

Librarian and Curator—E. Baynes Reed, London.

Council—W. Hague Harrington, Ottawa ; Rev. T. W. Fyles, Quebec ; J. Alston Moffat, Hamilton ; J. M. Denton, London ; Rev. Geo. W. Taylor, Victoria, B. C.

Editor "Canadian Entomologist"—Rev. C. J. S. Bethune, Port Hope.

Editing Committee—Prof. W. Saunders, Ottawa ; J. M. Denton, London ; Dr. Wm. Brodie, and Capt. Gamble Geddes, Toronto.

Auditors—J. M. Denton and E. Baynes Reed, London.

Delegate to Royal Society—H. H. Lyman, Montreal.

Rev. C. J. S. Bethune read a paper of much interest on the occurrence at Port Hope of immense numbers of *Aletia argillacea* on the 8th and 9th of October.

Prof. Macoun suggested the basswood tree as a possible food-plant of the larvæ, because there were not in the district sufficient malvaceous plants to furnish food for such numbers of insects.

Mr. Fletcher said that careful search had been made for several years on this tree, as well as on all plants allied to the cotton plant, but no traces of larvæ had been found. He had hitherto been inclined to believe that the moth bred in Canada, and that the theory of migration from the cotton States was not tenable, but what he had learned concerning the appearance of these insects this autumn had somewhat changed his views.

Mr. W. Hague Harrington stated that the appearance of the moths had been very noticeable at Ottawa at almost the same date as they were observed at Port Hope. The first week of October had been comparatively wet, with calms and light winds varying from east through south to west. Sunday, 9th Oct., had been a remarkably mild day, and on that evening the moths had swarmed at some electric lights. On the following morning he had observed upon the front of the Ottawa Bank a great number of moths, at least 250 or 300. The building faced the north, being situated opposite the Parliament Square, and had in front of it an electric light. Moths were also seen at several points in the city, but not in any

great number. From the fresh, unrubbed condition of all those seen he then thought that they could not have flown far, and that possibly they might have been bred upon some of the plants on the Government grounds. Since hearing Mr. Bethune's paper, however, he was more inclined to favor the migration theory.

Mr. J. Alston Moffat reported that on Friday night, 7th Oct., immense swarms had appeared at Hamilton. He was informed by a friend that on that evening they had been around the electric lights literally in millions—the numbers being so great that he could not attempt to give an idea of them, other than by saying that all the insects previously observed by him were as nothing in comparison. Mr. Moffat visited the section of the city where they had been most numerous, on the following afternoon, and found the ground for a space of several yards around each electric light pole covered with these insects, every inch having at least one moth. Immense numbers had been crushed under foot, but the rest were lively, and darted off in their accustomed manner when disturbed. That night they were very abundant, but Sunday evening was wet and their numbers were lessened.

Mr. J. M. Denton said that in London the moths had not been observed, although there was an electric light quite near his house.

After the discussion the general opinion of the meeting was that a migration seemed indicated, and it was resolved that endeavors should be made to find out if the moths had been observed at points intermediate between Canada and the Southern States.

Mr. Fletcher exhibited some beautiful paintings, kindly loaned by Mr. Scudder, of four species of Thecla, viz., *strigosa*, *acadica*, *calanus* and *Edwardsii*, and he also showed specimens of several species of these butterflies, and pointed out the points of distinction or affinity.

It being one o'clock, the meeting adjourned until 2.30 p. m.

The afternoon session opened by the reading of a paper contributed by Prof. E. W. Claypole, "Suggestions to Teachers on Collecting and Preserving Insects," followed by two by Capt. Gamble Geddes on "Several Remarkable Captures during the Summer of 1887 in Ontario," and "Notes on the Genus Argynnis whilst Alive in the Imago State." In the discussion which followed the former paper, Mr. Moffat described his own capture of the ♀ of *Pelecinus polycerator*, and Mr. Fletcher described the unusual abundance at Ottawa of *Colias philodice*. At an excursion of the Field Naturalists' Club to Brittania, a few miles from the

city, the sandy shore of the Ottawa had been so thickly covered with them for a distance of several hundred yards, that at one stroke of the net he had captured 47, which, strange to say, were all males.

Prof. Saunders stated that he had made search near London for the larvæ of *Papilio cresphontes*, where it had formerly been captured, but without success.

Mr. Fletcher exhibited a fine collection of Canadian species of the genus Chionobas, and explained the great value of these insects on account of their rarity hitherto in collections. *C. Macounii* Edw. was a new species which had been collected by Prof. Macoun at Nipigon in 1885, and the Rocky Mountains in 1886 Closely allied to it was *C. Gigas* Butler, of which until the past summer only three specimens were known in collections. Other beautiful species exhibited and described were *C. Californica*, *C. Chryxus*, *C. Jutta*, *C. Varuna* and *C. Uhleri*, of which Prof. Macoun had taken specimens in the Rocky Mountains.

A pleasant and valuable paper by the Rev. George W. Taylor, of Victoria, B. C., was read, describing an ascent of Mount Finlayson, B. C., in search of *C. Gigas*, and the success which had attended the party.

Prof. Macoun, who had accompanied Mr. Taylor, described the manner of flight of this butterfly, which was swift and ceaseless, as was the case with the specimens of *C. Macounii* taken at Nipigon; all the specimens taken, it may be added, of both species, were males.

Mr. Fletcher exhibited three specimens of the rare *Papilio Nitra*, two taken by Prof. Macoun in the Rocky Mountains, the other by Mr. N. H. Cowdry at Regina, N. W. T.; also some interesting species and varieties of Colias, regarding which there was discussion by several of the members.

Attention was then called to the valuable paper by Mr. H. H. Lyman in the October number of the ENTOMOLOGIST, and the beautiful plate accompanying it. A series of the moths brought by different members of the Council was examined in connection with this paper.

Mr. J. Alston Moffat exhibited and distributed among the members specimens of two new species of moths which had been captured by him at Hamilton, and which had been described by Prof. Fernald and Prof. Grote respectively as *Protocteras Moffatiana* and *Scopelosoma Moffatiana*.

Mr. Fletcher showed specimens of an Halesidota and of its larvæ, which had been very abundant and destructive upon the Douglas Fir in British Columbia during the past year. He also distributed a collection of Coleoptera sent from Vancouver Island for this purpose by Rev. G. W. Taylor.

Mr. W. Hague Harrington read a paper on the "Nuptials of Thalessa," describing the emergence and copulation of these the largest of our Hymenoptera (Can. Ent., p. 206).

Mr. Moffat read a suggestive paper on "Species and Varieties," deprecating strongly the doing away with all names distinctive of well marked varieties.

Prof. Macoun agreed with Mr. Moffat that every variety should have a name distinguishing it, and that much was lost if such was not the case.

Rev. C. J. S. Bethune submitted a circular letter from Prof. Alfred Wailly, of England, asking for specimens of any silk moths or their cocoons.

Mr. Fletcher drew attention to an article which had appeared in the August number of the *Canadian Horticulturist*, condemning the use of Paris green as an insecticide. He considered that article inaccurate and very injurious, as it might prevent the farmers from making use of this most valuable remedy, and in confirmation of his opinion read a letter from Prof. A. J. Cook describing experiments with Paris green, and proving that no ill effects could result from eating potatoes or fruit upon which it was used in the ordinary manner for the prevention of insect attacks.

Mr. Harrington submitted a note on "Further Observations on *Oryssus Sayi*," in which attention was also drawn to a clerical error in paper on that insect in the May number of the Entomologist.

A vote of thanks was unanimously ordered to be conveyed to the Mayor and City Council for the use of the council chamber and committee room in the City Hall for the meetings of the Society.

The meeting adjourned at 6 p. m., *sine die*.

W. Hague Harrington, Secretary *pro tem.*

HISTORY OF THE PREPARATORY STAGES OF COLIAS ALEXANDRA, Edw.

BY W. H. EDWARDS, COALBURGH, W. VA.

EGG.—Fusiform, thick in middle, tapering both ways, the base a little broader than the summit; some examples have the side convex from middle to either end, but others have the upper half a little incurved; ribbed longitudinally, the number of ribs sixteen, three or four of which

end at about four fifths the distance from base; ribs low, narrow, the spaces between flat, and crossed by many fine ridges; top rounded; the micropyle is in centre of a rosette of fine cells, outside of which is a ring of larger ones; color yellow-green. Duration of this stage four days.

YOUNG LARVA.—Length .07 inch; cylindrical, a little thickest on 2 and 3; on the ridges of the segments are many black points, each of which gives a short white hair; among these are rounded black tubercles, some of which give long black hairs, but most bear short white clubbed appendages, longest on 2 and 13; on 3 and 4 these are in straight cross row, four on either side, the lowest being in line with the spiracles, bent after 4, and to 12, there are three on either side, disposed so as to make three longitudinal rows, of which the sub-dorsal has the appendage on the front ridge, the upper lateral on fourth ridge, and mid-lateral on second ridge; on 2 are three appendages on either side the mid-dorsal line, two of them at the front, the third behind and between the others; lower down on same segment are two more in vertical line; on all segments from 2 are two black hairs over feet and legs, and in same line; color greenish-brown; head rounded, scarcely depressed at top; color black; the hairs white. Duration of this stage 4 to 5 days.

After first moult.—Length .14 inch; nearly same shape; the appendages present, those on dorsum paddle-shaped, quite broad at top, the thin side running with the long axis of body, those on sides clubbed; all from black tubercles; color brown-green; head more green than body, rounded, depressed; with many white tubercles and white hairs. Duration of this stage about 6 days.

After second moult.—Length .2 inch: color yellow-green, thickly covered with a white down; head color of body. During this stage the larvæ became lethargic, and so passed the winter.

After third moult, in spring.—Length .36 inch; color dark green; the basal ridge yellowish, but there is no distinct band; head as before, yellow-green. The next moult took place about seven days after the larvæ began to feed.

After fourth moult.—Length .6 inch; color dark yellow-green; there is now a band along base, pure white, stained in middle of some segments, usually 3, 4 and 12, with pink; as the stage progresses, the pink appears on other segments and in a few hours runs through the length of the band.

MATURE LARVA.—Length 1.1 inch; shape of *Eurydice* and *Philodice;* color one shade of yellow-green, the under side a little lighter;

much covered with small black tubercles, the hairs from which are short, straight, and over dorsum, black, but on the sides, gray; along base a white band, with broken dashes of red-orange running through it; head rounded, depressed at top; color yellow-green, studded with black tubercles, which give short black hairs. From fourth moult to pupation 13 days, in April.

CHRYSALIS.—Length .8 inch, greatest breadth .2 inch, depth .26 inch; shape of *Eurydice* and *Philodice;* compressed laterally, the thorax prominent; the head case pointed, beak-like; the mesonotum rounded (almost angular); color yellow-green, the dorsal side darker than ventral; on ventral side of abdomen next wings three small reddish spots in line. Duration of this stage 9 and 10 days.

On 29th July, 1884, I received 16 young larvae, hatched *en route*, from Rosita, Col., sent by Mr. H. W. Nash, the eggs laid 23rd and 24th July, on Astragalus. On 2nd Aug., they began to pass first moult, on 8th the second moult. Shortly after, they became lethargic, and I sent them to Clifton Springs, New York, to be placed in the "Cooler" for the winter. On 7th March, 1885, I received them from Clifton, all dead but one, and this died a few days later.

On 18th Aug., 1886, I received six larvae hatched *en route*, sent from Central City, Col., by Prof. G. H. French, the eggs having been laid on Thermopsis Tabacea var. Montana. These larvae began to pass first moult, 25th Aug.; the second moult was overlooked; on 4th Sept., two out of five larvae became lethargic, and by 11th Sept., the other three had gone same way. In October, all six were sent to Clifton Springs. These came back alive, 21st March, 1887, and were placed on white clover in pot, and covered by muslin bag. On 1st April, they were first noticed as feeding; on 7th, one larva passed 3rd moult; this one passed 4th moult, 13th April, and pupated 26th April. The imago came on 6th May, a female of type *Edwardsii* in some important points, the marginal borders to fore wings being unusually broad and heavy.

The second larva passed third moult on 15th April, the fourth on 25th, pupated 5th May, and the imago came out 14th May, a female, typical *Alexandra*, with no borders whatever. This one was like the parent female, and consequently the spring butterfly in this case was like the fall butterfly that produced it.

On 28th June, 1887, I received four young larvae from Central City, the eggs having been obtained by Master William Lake, at the request of

Prof. French. These were of the earliest butterflies, and I expected to raise them to imago the same summer.

On 2nd and 3rd July, all these larvæ passed 1st moult ; on 6th July, two passed 2nd moult ; on 10th or 11th, one passed 3rd moult. On 27th July, the three survivors had been lethargic for about a week, as I recorded. Later, I sent these to Clifton Springs. So that larvae from the earliest flight of the butterflies, as far as observed, hibernate, as do the larvae of the later flight, and all would produce butterflies in spring. How comes it then that there is the appearance of a second brood of the butterfly in late summer, or August? Apparently one brood flies in June, another in August, though fresh butterflies are also found in July, and one would expect eggs of the June brood to produce the August butterflies. The explanation I conceive may be this : in June, the butterflies from the lower elevations first come from pupae, in July from higher elevations, and in August from the highest of all, and a constant stream of fresh butterflies is kept up from higher to lower elevations. Mr. David Bruce has collected several seasons in Colorado at every altitude, and in 1887, particularly, his attention was directed to the habits of *Alexandra*, and this is what he writes 22nd Sept., 1887 : " I think my notes and the specimens sent will satisfy you that there can be but one brood annually of *Alexandra*. This species is a powerful flier and takes very long flights, and in the narrow canons will fly along the side of the trail or stream down hill for miles. Even Colias *Meadii*, when it once gets in the canons, will follow the track, and I have found several at Webster, 9000 feet, and below it, though their proper habitat is 2000 or 3000 feet higher." *Alexandra* is found at various elevations from 6000 to 10,000 feet.

As to *C. Edwardsii* and its relationship to *Alexandra* ; I have of late years thought it probable that the former might be a dimorphic form of the other. But if there is but one annual brood of *Alexandra*, that view is not tenable. *Edwardsii* was named by Dr. Behr, from examples taken in Nevada, and was first described in vol. 1, But. N. A., in 1869. At that time very few examples were known, and the same is true as to *Alexandra*, originally described in 1863. It was not till Mr. Mead collected in the summer of 1871, in Colorado, that *Alexandra* became better known. Since then a vast deal of collecting has been done in Colorado, and *Alexandra* is found in every collection. *Edwardsii* yet differed from *Alexandra*, as known up to 1869, in the shape of the wings, these being narrow, the fore wings pointed apically, the hind margins incurved ;

in contrast to the shorter and broader wings of *Alexandra*, with rounded apices and hind margins. The fore wing of the female had more or less of a marginal border, and there was an orange discal spot to hind wing. In *Alexandra*, the female had no border, but was immaculate, and there was but a pale discal spot, if any at all, on hind wing, and never orange. There were other differences of less importance perhaps, but the ones mentioned were enough to make the separation of the two forms not merely proper but imperative. In 1877, Pr. Cal. Acad. Nat. Sci., Mr. Henry Edwards expressed the opinion that *Edwardsii* was but a variety of *Alexandra*, and with my present experience, I can only join in the same conclusion. The two females which came from one laying of eggs, as before related, were of the two types in many respects. One was immaculate, and altogether, in color and markings, the typical *Alexandra* as figured in B. N. A. (and like the mother insect), the other had the marginal border of *Edwardsii*, while both had the pointed wing given as characteristic of the latter. The species is *Alexandra*, and *Edwardsii* a variety of the same.

Among the many examples recently sent me by Mr. Bruce are two albino females, one with, the other without, any traces of marginal borders. Usually the discal spot on under side of hind wing is without a circlet, but I have two males with a narrow brown ring, and one of these has a second small spot, such as appears in many species of the genus. One of Mr. Bruce's males has a broad, not very distinct, border outside the ring. Generally the fringes throughout are yellow, but occasionally they are pale pink. Some examples have no pink at base of hind wings, others a minute patch of it. In none have I ever seen a trace of submarginal spots on either wing below, or of a patch at outer angle of hind wing.

NOTES ON THE GENUS ARGYNNIS WHILST ALIVE IN THE IMAGO STATE.

BY GAMBLE GEDDES, TORONTO, ONT.

1. ARG. LAIS, Edw.

A new species discovered by me in 1883, whilst collecting for Mr. Henley Grose Smith, of England. It was described by Mr. W. H. Edwards shortly after my return. In the end of June and beginning of

July, I found this insect easy to capture. It was comparatively rare in some districts of the North-west Territory, but at the principal crossing of the Red Deer River and the neighborhood of Fort Edmonton, it was quite common. When the orange lilies of the prairies, *Lilium Philadelphicum*, were in bloom, I took many specimens of both sexes upon these flowers, and could approach them quite easily with the killing bottle, and so avoid the necessity of using a net and running the chances of rubbing their wings. Mr. Edwards has figured this species in Part I., Vol. III., of the "Butterflies of North America."

2. ARG. CYBELE, F.

Taken at Edmonton and surrounding country, flying in company with *Lais* and attracted by the blossoms of the numerous vetches which occur in that district.

3. A. CORONIS, Behr.

This beautiful insect I found most common at Fort Macleod, but I also took specimens in the Kicking Horse Pass, and at Calgary, 100 miles north. Here they were not by any means plentiful. It occurs principally late in the season when the harvesting is going on, and when the Golden Rod is in bloom. At the entrance to the Kootenay Pass many perfect specimens were taken. The specimens captured were very variable, and one was thought by Mr. Edwards to be new; it turned out however to be *Coronis*. The specimen was called by him *Arg. Baucis*, and is now in the collection of Mr. Henley Grose Smith, Isle of Wight.

4. A. CHARICLEA, Schneid.

5. A. BOISDUVALLII, Somm.

I took both these species in the Crow Nest Pass, and both at great altitudes. Strange to say, I saw none of them in the foot-hills, or the rolling prairie, but last summer *Arg. Chariclea* appeared in large numbers in the hills at Port Arthur, Lake Superior. It would be useful to know from any members of the Society what their observations have been regarding the localities of these species. They seem to be in perfect order all through the summer, and quite like *A. Myrina* in this respect.

6. A. ATLANTIS, Edw.

This species occurred in all parts of the Mountains, and was at its best in the early part of July.

7. A. EURYNOME, Edw.

First taken about Calgary, N. W. T., and afterwards in all the valleys here and there through the Rocky Mountains. It has many varietal forms. The silver spots on under side of secondaries are nearly covered over with yellow and green scales in some specimens, whilst in others they are silver to the very edges of the spots. This species was abundant in the vicinity of the Crow Nest Pass in all its forms, including *Erinna* and *Arge*. Some of the specimens also varied much in size, the smallest being about the same measurement across the primaries as *Arg. Myrina*. This was particularly noticeable in the males, the females being for the most part of an uniform size.

8. *Var.* ERINNA.

9. *Var.* ARGE, Strk.

No notes were particularly taken in connection with either of these forms.

10. ARG. CLIO, Edw.

In capturing this insect in 1883, I thought that I was the happy possessor of *A. Bischoffii* or *A. Opis*, and wrote to Mr. W. H. Edwards to that effect. It turned out otherwise, however. *A. Clio* was first seen by me and taken in small numbers in 1883, but in 1884 occurred more commonly in several distinct localities.

11. ARG. ARTONIS, Edw.

This is uncommonly like *Clio*, in my opinion, and I have not been able to distinguish one from the other up to the present time.

12. A. MONTICOLA, Behr.

I took but very few of this species in the Crow Nest Pass, and they varied much from other specimens I have seen, notably from California. In the Kicking Horse Pass and other localities in the Rocky Mountains, however, larger varieties were captured resembling very closely specimens from the southern slope of the Pacific coast. The silver spots usually found in the Argynnidæ on the under side of the posterior wings were entirely of a yellow color, and no appearance of silver was visible in the smaller specimens, whilst in the larger varieties more than two-thirds of the spots was covered with silvery scales.

13. A. EDWARDSII, Reak.

14. A. NEVADENSIS, Edw.

A. Edwardsii is a lively insect to follow with a net, and a man must

be in excellent training to do much with it in that way. I have been led away a long distance from my camp (and often from a well-earned meal) upon seeing one of these insects flit by. It is, like its confrère *Arg. Nevadensis*, a bewitching and tantalizing creature—bewitching because of the beautiful combination of the pale green and silver of the under side in the sunlight, and the red and orange of the upper side which contrasts so wonderfully and at which one gets a glimpse occasionally during its flight. It flies more like the Satyridæ, by which I mean it folds its wings completely over its back whilst flying, and seems to traverse a long space until it becomes necessary to open the wings again to prolong its flight, or to settle on the ground. Tantalizing, I call it, because it indulges in short and rapid flights, making one suppose it is an easy matter to follow it a few yards and then capture it. I have had to creep along on all fours sometimes, and occasionally drag myself along on my stomach, to secure these specimens, and then have missed about 50 per cent. of the number followed. *Nevadensis* and *Edwardsii* do not fly high, and when alighting after a short and rapid flight, they expand the wings to the full extent, until the edges touch the ground. This of course is when they alight on the bare soil, which they frequently do. Like most Argynnidæ, they are both fond of the thistle, and are much more easily approached when sipping honey from the flowers than when they come down to the ground.

15. A. Bellona, F.

This small species has been taken in large numbers in the vicinity of Brandon, Manitoba, and the further west I proceeded the rarer it became. At Calgary it was quite rare, and resembled *Epithore* very much, with the exception of the darker colors on both upper and under surfaces of the wings.

16. A. Myrina, Cram.

Only at one point in the North-west was this species common, and that was about 50 miles west of Calgary. As in this part of the country, marshes and the edges of streams were the principal haunts.

17. A. Triclaris, Hüb.

Taken only at extreme altitudes, where snow was plentiful on the neighboring hills and peaks.

18. A. Leto, Behr.

This is a remarkable looking insect on the wing, and until the eye becomes accustomed to it, may be taken for a Papilio. I allude to the

♀, for I cannot remember seeing a ♂ flying, or if I did, was not prepared to make notes about it. As most of our collectors are aware, the ♀ and the ♂ differ in appearance considerably, the female being a very dark brown (almost black) and yellow, whilst the male is red and brown like any other Argynnis.

I append a list of Argynnidæ which I have myself taken at different times, with notes on their flight and habits.

1. *Arg. Lais*, Edw. Very lively on the wing, but easily captured with cyanide bottle from flowers.

2. *Arg. Cybele*, F. Precisely the same as *Cybele* in this Province in its movements. I never saw *Cybele* from the time I left St. Paul, Minn., until I arrived at Edmonton, N. W. T.

3. *Arg. Coronis*, Behr. Extremely lazy and easy of capture. I have walked through patches of golden rod and knocked the stalks and flowers about considerably without disturbing *Coronis*. I have also taken them between my thumb and forefinger without any attempt at escape.

4. *Arg. Charidea*, Schneid.; 5. *Arg. Boisduvallii*, Somm. Not a particularly lively fly. Often difficult of capture, as it flies high in the air at certain parts of the day, particularly the evening. I was not aware that these were separate species until my return, and so my notes apply to both.

6. *Arg. Atlantis*, Edw. A curious fact in connection with the dark variety of *Atlantis* taken in the Mountains is that it constantly alighted on the trunk of a tree head downwards, like the Graptas often do. Very lively and about only during the brightest part of the day.

7. *Arg. Eurynome*, Edw. A slow insect for the most part and easily approached.

8. V. *Erinna;* 9. V. *Arge*, Streck. Not observed.

10. *Arg. Clio*, Edw. Principally males taken; very quick and hard to catch without rubbing the wings.

11. *Arg. Artonis*, Edw. Same as above.

12. *A. Monticola*, Behr. Very rapid flight; hard to take.

13. *A. Edwardsii*, Reak.; 14. *A. Nevadensis*, Edw. Short zig-zag flight; alights quite frequently on the ground; extremely difficult to take either in flight or whilst at rest.

15. *Arg. Bellona*, F. Specimens taken altogether whilst flying, with only one or two exceptions. Comparatively easy to catch on the wing.

16. *Arg. Myrina*, Cram. Same as any locality in Ontario.

17. *Arg. Triclaris*, Hüb. Slow in flight, but difficult to take, as it flies over boggy and marshy places in the valleys amongst the snow-caps.

18. *Arg. Leto*, Beh. ♀ only observed; lively in flight and easily distinguished from its dark brown and yellow colors.

NOTES ON CALLIMORPHA.

BY JOHN B. SMITH, WASHINGTON, D. C.

In the early spring of 1887, while arranging the National Museum collection of *Arctiidæ*, I tried to make out the varieties of *Callimorpha lecontei* listed in our catalogues, and soon came to the conclusion that we had to do with more species than were generally accepted. I investigated the literature of the subject and prepared a paper, the results of which were first communicated to the Entomological Society of Washington at their March meeting (see Entom. Americ., iii., p. 20). At this time I had concluded to describe three new species, viz., *lactata*, *suffusa* and *confusa*, and prepared the descriptions for Ent. Am, sending the MSS. of the monograph to the Proceedings of the National Museum. For reasons hereinafter stated, I finally identified my *confusa* with *lecontei* Bd., and withdrew my description of that species, changing also the name in the proof of the monograph.

The descriptions of *lactata* and *suffusa* appeared in Ent. Am., iii., 25, and I refer on p. 26 to the monograph of the genus for the Proc. U. S. N. Museum.

In August, at the meeting of the Ent. Club, A. A. A. S., I read from advance sheets of my paper the substance of my conclusions, and tried to convince the gentlemen present of their correctness—I grieve to say, with very little success, as a reference to the report of the meeting in Ent. Am., iii., 103, will show. Mr. Lyman, to whose paper I will presently refer, had evidently not seen this when his MSS. went to the printer.

Prof. Riley, and Messrs. Hulst and Graef vigorously opposed my views, and one emphatic gentleman (not in open meeting, however,) pronounced them profane adjectived nonsense. Mr. Edwards wrote me I was all wrong, and Mr. Butler, whose reputation as a lumper is none of the best, considered six species an abundance, and they not very good ones either.

My paper appeared Sept. 16th, and was distributed to correspondents

of the Museum; my extras came in a few days later. No one has responded as yet, so I do not know whether I have made converts or not.

Under these circumstances, Mr. H. H. Lyman's paper on the species of *Callimorpha*, CAN. ENT., Oct., 1887, agreeing as it does in the main with my own conclusions, was most gratifying, and restores to some extent my faith in the intelligence of Lepidopterists. Mr. Lyman, while agreeing in the main with my results (he could not have seen my paper), presents some differences to which I beg to call attention. I will do it under the call of species, following his order, which differs from my own.

C. LECONTEI Bd.

Mr. Lyman accuses me of mistaking the type of this species, and he is right. My excuse is that I have never seen *lecontei* as Mr. Lyman here fixes it. I had seen Boisduval's figure, and Herrich-Schaeffer's figure, which evidently referred to the same species. I have never seen specimens like Mr. Lyman's figures 1, 2 and 3. His figure 4 and all the others are familiar to me. The most obvious and striking point in Boisduval's figure was the transverse black band near the base of the primaries, and as I knew only one species that had this peculiarity, I referred the name to that species, crediting the figures with sufficient inaccuracy to cover the differences between them and my specimens. I did not deem it possible that there was a form that I had not seen, so close as to be confusing. As it proves, I was mistaken, and I confess Mr. Lyman's figures 1, 2 and 3 were a surprise to me. He is undoubtedly correct, however, in his references and identification of the species.

Var. *confinis* Wlk. This is without doubt a mere synonym of *militaris* Harr. Mr. Butler kindly sent me a drawing of that form. The Museum series readily fills all gaps between figures 6 and 8 on Mr. Lyman's plate.

Query.—Is the typical *lecontei* local? It seems passing strange that none of the numerous collections I have seen should have a single specimen referable to it, so as to save me from blundering!

C. CONTIGUA Wlk.

This needs no further reference. I thoroughly agree with Mr. Lyman in all he says. It may be well to say here that in my paper I have described and figured the genitalia of nearly all the species, and the differences there noted bear out the conclusions otherwise reached.

C. CONFUSA Lyman.

Undoubtedly a good species, which in my paper I have referred to as

lecontei. The specific character of markings is found in the form of the broad half band of the primaries that arises from the internal margin, and sends off from its summit a band to the outer margin below the apex, and a spur inwardly. In my paper I figure some varieties with the markings much more nearly obsolete. Mr. Lintner's description of the larva of *C. lecontei* (Ent. Contr., iii., 143) refers to this form. I have seen the imagos. Mr. Lintner found it on Spear-mint, *Mentha viridis.*

I have found the species common in the Catskills, where all the specimens taken were of this species. At first, as above suggested, I was inclined to consider this a distinct species, and oddly enough selected the same name for it that Mr. Lyman did. My reasons for changing my opinion have been already given.

C. SUFFUSA Smith.

This is the species figured by Mr. Stretch in his Zygaenidæ and Bombycidæ as typical of *lecontei*, and he credits Mr. Saunders with the specimens. This is my authority for the locality, Canada, for this species, and also my authority for referring Mr. Saunders's description of the larva in CAN. ENT., i., 20, to this species, though somewhat doubtfully.

Unaware of the existence of forms like the true *lecontei*, I also assumed from these facts that Mr. Caulfield referred to this form as *lecontei;* he assumed the distinctness of *lecontei* and *militaris*, which proves unfounded, and which also misled me. I am sorry my name does not please Mr. Lyman. The matter is not so bad as it might be, however, since, as I shall show hereafter, the name *clymene* is misapplied and must be credited to a different species. The species varies quite extensively, and I have figured a number of the forms. One specimen is nearly immaculate, having only the margins dusky.

C. FULVICOSTA Clem.

Mr. Lyman should have cited as a synonym *Tanada conscita* Wlk., in part. He cites it for the ♀ only.

C. VESTALIS Pack.

Mr. Lyman cites this as a synonym of *fulvicosta*, in my opinion quite erroneously. Query—Whether Mr. Lyman really knows *vestalis?* It is smaller, whiter, without any creamy tinge, and appears more frail and *Euchaetes* like. I feel as confident of its distinctness as of any others of the species. To this I cite *Tanada conscita* Wlk., as I believe Mr.

Walker had this before him, with a yellowish ♂ *fulvicosta*. Mr. Butler writes of this species: "*H. conscita* = *vestalis* var. = *fulvicosta* var."

C. INTERRUPTO-MARGINATA De Beauv.

According to Mr. Butler, this form has been previously described by Peter Brown as *clymene*. The citation and description I have given in my paper. This will please Mr. Lyman, since it does away with an objectionable name, though it has the disadvantage of compelling a new association between name and insect.

C. CLYMENE Esp.

As this name was pre-occupied by Brown as above stated, the next name in order of time must be used, and this is *C. colona* Hb.—not cited by Mr. Lyman.

C. CONSCITA Wlk.

Mr. Lyman cites my name *lactata* as a synonym—erroneously, I think. Mr. Walker confused two, if not three, species under the one name, and in addition referred them to the wrong genus. Such a species as that intended by Walker never existed, and I do not think any point should be stretched in his favor. Besides, Mr. Lyman is not consistent. The same reasoning that makes *lactata* a synonym of *conscita*, will make *suffusa* a synonym of *reversa*—or worse—Mr. Stretch's description includes also *confusa* Lyman, and on this theory one part of Mr. Stretch's species is a synonym of *contigua*. I separated *suffusa*, and the name stands for the remaining part, viz., *confusa* Lyman, which would remain only as a synonym of *reversa*. I scarcely expect Mr. Lyman's adhesion to this theory, but unless he so holds, my *lactata* will stand.

I propose in view of the preceding, the following synonymy, adopting here my own order of species:

1. CLYMENE Brown.
   interrupto-marginata DeB.
   comma Wlk.

2. COLONA Hb.
   clymene || Esp.
   carolina Harr.

3. LACTATA Smith.
   ♂ *conscita* Wlk., in part.

4. LECONTEI Bd.
   var. MILITARIS Harr.
   confinis Wlk.
5. CONTIGUA Wlk.
   reversa Stretch, in part.
6. SUFFUSA Smith.
   lecontei ‡ Stretch et Auct.
   reversa Stretch, in part.
7. CONFUSA Lyman.
   lecontei ‡ Auct.
   reversa Stretch, in part.
8. FULVICOSTA Clem.
   ♂ *conscita* Wlk., var. *b*.
9. VESTALIS Pack.
   ♀ *conscita* Wlk.

For a full discussion of the generic characters and a history of the genus, I refer to my paper in Proc. U. S. National Mus., 1887, pp. 338–353, and plates xiii. and xiv.

[Mr. Lyman's paper was in type before the end of September, and was in our hands in MS. some time before. He could not, therefore, have seen Mr. Smith's paper. Our October number was delayed for three weeks, waiting for the Plate.—ED. C. E.]

FURTHER OBSERVATIONS ON ORYSSUS SAYI.

BY W. HAGUE HARRINGTON, OTTAWA.

During the past season I endeavored, as opportunity offered, to confirm and supplement the observations upon this insect recorded in the May issue of the CANADIAN ENTOMOLOGIST, pages 81–86. The insects appeared at least ten days earlier than in 1886, and on 29th May I captured, upon the old sugar-maple near Hull therein mentioned, four males, which were entirely black—var. *affinis*. Of these, one was dead in a spider's web, and had evidently furnished a meal to the spinner, and another had just been seized by a jumping spider of moderate size. On the following day I took a ♀, var. *occidentalis*, which had sought shelter,

or concealment, in the burrow of a *Diceca divaricata*. I also saw a specimen just about to emerge from its own burrow, down which it rapidly retreated backward, when I commenced to dig with my pocket knife in the tough wood. On 3rd June, Mr. Fletcher and the writer saw a ♀ var. *terminalis* ovipositing in a minute crack in the perfectly dead dry wood of the same old sugar-maple. The ovipositor of this insect was found to be one and one-quarter inches in length. At the same time I obtained two males, var. *affinis*, and my companion captured two specimens. We also saw two in their burrows, and tried to cut them out, but the wood defied our knives, and the insects retired to the interior, their burrows being evidently of considerable depth. The following day we saw two specimens, one on a telegraph pole, the other on an old maple, and on the 7th I captured on the same maple a ♀ var. *terminalis* and two ♂'s var. *affinis*. I saw also two gnawing their way out, but could not get them. The last date of capture was on 9th June, when I found two just about to emerge, which I succeeded in digging out after some patient and difficult cutting. These were both males, one var. *affinis*, the other var. *occidentalis*, with two white marks on face, and a large triangular spot on terminal segment above. Of twelve specimens captured by me during the season (29th May to 9th June) there were var. *terminalis*, three ♀ ; var. *occidentalis*, one ♂, one ♀; var. *affinis*, seven ♂. This confirms my previous observations that nearly all those with a portion of the abdomen red are female, while those with the abdomen entirely black are male, although an occasional male will be found partly red, or a female entirely black. In conclusion, I wish to correct a clerical error in the paper above mentioned. On page 83, the seventh and sixth lines from foot should read:

1. *Oryssus Sayi* Westwood, 1835 = *maurus* Harris.
2. *terminalis* Newman, 1838 = *hæmorrhoidalis* Harris.

EXCHANGE.

Mr. W. Harcourt Bath, of Ladywood, Birmingham, England, is anxious to correspond with North American Entomologists with a view to procuring specimens of Canadian Dragon-flies, and is willing to give in exchange British Dragon-flies and Lepidoptera.

ERRATUM.—Page 218, line 10, for "guages," read "gangues."

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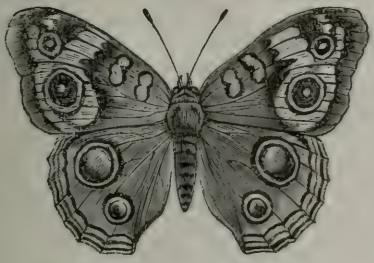

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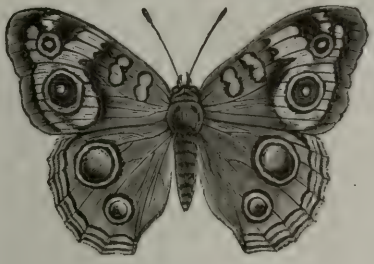

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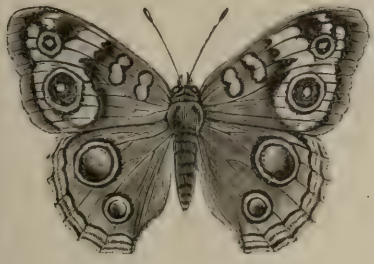

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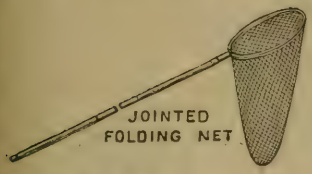

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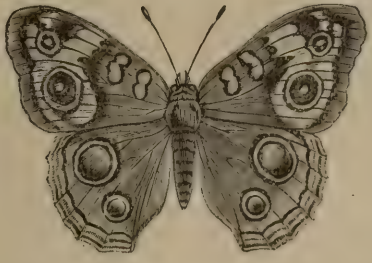

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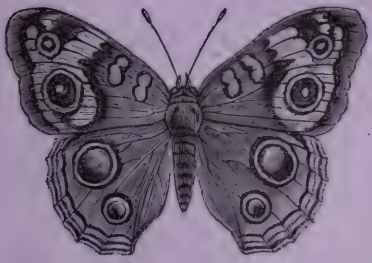

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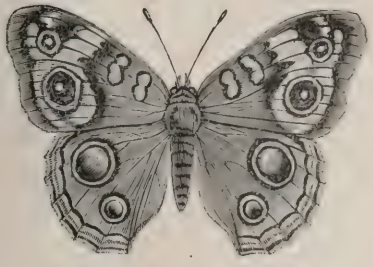

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